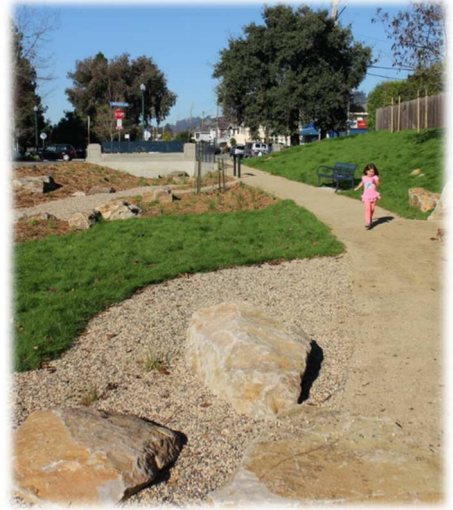




# Green Infrastructure Plan



August 30, 2019



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## Acronyms

<b>ABAG</b>	Association of Bay Area Governments
<b>BASMAA</b>	Bay Area Stormwater Management Agencies Association
<b>CCCWP</b>	Contra Costa Clean Water Program
<b>CCW SWRP</b>	Contra Costa Watersheds Stormwater Resource Plan
<b>GI</b>	Green Infrastructure
<b>GIS</b>	Geographic Information System
<b>IRWMP</b>	Integrated Regional Water Management Plan
<b>MRP</b>	Municipal Regional Stormwater Permit
<b>MTC</b>	Metropolitan Transportation Commission
<b>NPDES</b>	National Pollutant Discharge Elimination System
<b>PCBs</b>	Polychlorinated Biphenyls
<b>RWQCB</b>	California Regional Water Quality Control Board – San Francisco Bay Region
<b>TMDL</b>	Total Maximum Daily Load

# 1 Introduction and Overview

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## 1.1 Regulatory Mandate

The Town of Moraga (Town) is one of 76 local government entities subject to the requirements of the California Regional Water Quality Control Board for the San Francisco Bay Region's (RWQCB's) Municipal Regional Stormwater Permit (MRP). The MRP was last reissued in November 2015<sup>1</sup>. The MRP mandates implementation of a comprehensive program of stormwater control measures and actions designed to limit contributions of urban runoff pollutants to San Francisco Bay.

MRP Provision C.3.j.i. requires the Town to prepare a Green Infrastructure Plan, to be submitted with its Annual Report to the RWQCB due September 30, 2019.

Green Infrastructure (GI) refers to the construction and retrofit of storm drainage to reduce runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use bioretention and other natural systems to detain and treat runoff before it reaches our creeks and Bay. Green infrastructure facilities include, but are not limited to, pervious pavement, infiltration basins, bioretention facilities or "raingardens", green roofs, and rainwater harvesting systems. Green infrastructure can be incorporated into construction on new and previously developed parcels, as well as new and rebuilt streets, roads, and other infrastructure within the public right-of-way.

Water quality in San Francisco Bay is impaired by mercury and by polychlorinated biphenyls (PCBs). Sources of these pollutants include urban stormwater. By reducing and treating stormwater flows, green infrastructure reduces the quantity of these pollutants entering the Bay and will hasten the Bay's recovery.

Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using green infrastructure by June 30, 2020. Regionally, Permittees must also project the load reductions achieved via Green Infrastructure by 2020, 2030, and 2040, showing that collectively, reductions will amount to 3 kg/year PCBs and 10 kg/year mercury by 2040.

*“Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using Green Infrastructure by June 30, 2020.”*

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<sup>1</sup> Order R2-2015-0049

### 1.1.1 Further Background on Mercury and PCBs in San Francisco Bay

The MRP pollutant-load reduction requirements are driven by Total Maximum Daily Load (TMDL) requirements adopted by the RWQCB for mercury (Resolution No. R2-2004-0082 and R2-2005-0060) and PCBs (Resolution No. R2-2008-0012). Each TMDL allocates allowable annual loads to San Francisco Bay (a Waste Load Allocation, or WLA) from identified sources, including from urban stormwater.

The mercury TMDL addresses two water quality objectives. The first, established to protect people who consume Bay fish, applies to fish large enough to be consumed by humans. The objective is 0.2 milligrams (mg) of mercury per kilogram (kg) of fish tissue (average wet weight concentration measured in the muscle tissue of fish large enough to be consumed by humans). The second objective, established to protect aquatic organisms and wildlife, applies to small fish (3-5 centimeters in length) commonly consumed by the California least tern, an endangered species. This objective is 0.03 mg mercury per kg fish (average wet weight concentration). To achieve the human health and wildlife fish tissue and bird egg monitoring targets and to attain water quality standards, the Bay-wide suspended sediment mercury concentration target is 0.2 mg mercury per kg dry sediment.



A roughly 50% decrease in sediment, fish tissue, and bird egg mercury concentrations is necessary for the Bay to meet water quality standards. Reductions in sediment mercury concentrations are assumed to result in a proportional reduction in the total amount of mercury in the system, which will result in the achievement of target fish tissue and bird egg concentrations.

The PCBs TMDL was developed based on a fish tissue target of 10 nanograms (ng) of PCBs per gram (g) of fish tissue. This target is based on a cancer risk of one case per an exposed population of 100,000 for the 95<sup>th</sup> percentile San Francisco Bay Area sport and subsistence fisher consumer (32 g fish per day). A food web model was developed by San Francisco Estuary Institute (SFEI) to identify the sediment target concentration that would yield the fish tissue target; this sediment target was found to be 1 microgram ( $\mu\text{g}$ ) of PCBs per kg of sediment.

Twenty percent of the estimated allowable PCB external load was allocated to urban stormwater runoff. The Bay Area-wide WLA for PCBs for urban stormwater is 2 kg/yr by 2030. This value was developed based on applying the required sediment concentration (1  $\mu\text{g}/\text{kg}$ ) to the estimated annual sediment load discharged from local tributaries.

## 1.2 Objectives and Vision

This Plan will guide a shift from conventional “collect and convey” storm drain infrastructure to more resilient, sustainable stormwater management systems that reduce runoff volumes, disperse runoff to vegetated areas, harvest and use runoff where feasible, promote infiltration and evapotranspiration, and use natural processes to detain and treat runoff. Green infrastructure features and facilities include, but are not limited to, pervious pavement, infiltration basins, and bioretention facilities (“rain gardens”), green roofs, and rainwater harvesting systems.

As required by Provisions C.3.a. through C.3.i. in the MRP, these “Low Impact Development” practices are currently implemented on land development projects in the Town. Specific methods and design criteria are spelled out in the Contra Costa Clean Water Program’s (CCCWP’s) *Stormwater C.3 Guidebook*, which the Town has referenced in Chapter 13.04 of the Town’s Municipal Code, entitled Stormwater Management and Discharge Control.

This Plan details how similar methods will be incorporated to retrofit existing storm drainage infrastructure using green infrastructure facilities constructed on public and private parcels and within the public right-of-way.

- *Green infrastructure facilities previously constructed by the Permittee*

The Town actively seeks opportunities for GI. To date, the Town has not constructed a GI facility.

## 1.3 Plan Context and Elements

### 1.3.1 Planning Context

- *Municipal geography*

According to the U.S. Census Bureau; the Town of Moraga is 9.43 square miles in at an elevation of 499 feet (152 m) Moraga is located adjacent to the cities of Lafayette and Orinda, as well as the unincorporated community of Canyon.

- *Demographics*

Of the total area of 9.4 square miles (24 km<sup>2</sup>), 0.09% is water. Moraga is in a valley, surrounded by rolling hills. Large sections of the Lafayette-Moraga Regional Trail pass through the town.

The 2010 United States Census reported that Moraga had a population of 16,016. The population density was 1,696.3 people per square mile (654.9/km<sup>2</sup>). The Census reported that 14,293 people (89.2% of the population) lived in households, 1,545 (9.6%) lived in non-institutionalized group quarters, and 178 (1.1%) were institutionalized.

There were 5,570 households, out of which 1,945 (34.9%) had children under the age of 18 living in them, 1,073 households (19.3%) were made up of individuals and 564 (10.1%) had someone living alone who was 65 years of age or older. The average household size was 2.57. There were 4,268 families (76.6% of all households); the average family size was 2.95.

The population was spread out with 3,474 people (21.7%) under the age of 18, 2,342 people (14.6%) aged 18 to 24, 2,193 people (13.7%) aged 25 to 44, 4,947 people (30.9%) aged 45 to 64, and 3,060 people (19.1%) who were 65 years of age or older. The median age was 45.0 years. For every 100 females, there were 89.2 males. For every 100 females age 18 and over, there were 84.6 males.

There were 5,754 housing units at an average density of 609.4 per square mile (235.3/km<sup>2</sup>), of which 4,673 (83.9%) were owner-occupied, and 897 (16.1%) were occupied by renters. The homeowner vacancy rate was 0.7%; the rental vacancy rate was 4.1%. 12,073 people (75.4% of the population) lived in owner-occupied housing units and 2,220 people (13.9%) lived in rental.

➤ *Commitment and Actions for Sustainability*

On October 22, 2014, the Council formally accepted the Town's Draft Climate Action Plan (CAP) as an Advisory Document and directed staff to review the CAP annually and provide direction to Council on which strategies to implement as part of the Town's Annual Work Plan and Budget Review to assist the Town in reducing the overall greenhouse gas (GHG) emissions throughout the community.

Prior to the acceptance of the CAP by Council between 2008-2012, the Town completed several capital projects aimed at reducing overall emissions from daily operations, including retrofitting numerous parking lot and street lighting to LED, HVAC system/boiler upgrades in a number of Town buildings, insulation installation, and interior lighting occupancy sensors in several rooms throughout all Town buildings.

➤ *Staffing and Scope of Sustainability Programs*

The Town does not employ a full-time sustainability coordinator. However, the Planning Department, working in conjunction with the Parks and Building Maintenance Divisions of the Public Works Department, oversees the implementation of readily-available sustainability measures such as the provision of in-house recycling and green waste facilities for Town staff and water bottle refilling stations in public buildings, and actively pursues grant funding opportunities for energy-saving, emissions-reducing capital projects such as continued energy efficiency upgrades to Town buildings as technology improves, electric vehicle public charging infrastructure, etc.

➤ *CEQA*

The Planning Department, responsible for overseeing and guiding development in the Town of Moraga, is responsible for conducting environmental review for development projects and various land use programs in compliance with the California Environmental Quality Act (CEQA).

Please see: <http://www.moraga.ca.us/dept/planning/about>

### **1.3.2 Watersheds and Storm Drainage Infrastructure**

➤ *Watersheds and Watershed Characteristics and Challenges*

➤ *Walnut Creek Watershed*

According to the August 2018 Contra Costa Watersheds Stormwater Resource Plan, the Walnut Creek watershed encompasses the Grayson-Murderers, Town of Moraga, Pine-Galindo, San Ramon, and Las Trampas sub-watersheds. Draining the west side of Mount Diablo and the east side of the East Bay hills, Walnut Creek's major tributaries include San Ramon Creek, Bollinger Creek, Las Trampas Creek, Lafayette Creek, Grayson Creek, Murderer's Creek, Pine Creek, Tice Creek, and Galindo Creek. The Cities of Walnut Creek, Lafayette, Pleasant Hill and Danville lie completely within the boundaries of the Walnut Creek watershed, while the Cities of Town of Moraga, Martinez, and small areas of Moraga and San Ramon are partly within the watershed.

Agriculture and livestock were previously important industries in the valleys of the Walnut Creek watershed. An increase in housing and commercial development along the creek created the need for

improved flood control measures. Today, a stormwater drainage system reroutes surface waters from their original path through the valley. Land use and other physical factors have also affected the way surface and groundwater reach the creek channel.

In 2014, the Flood Control District assumed management of the lowest four miles of Walnut Creek removed and began restoration planning. With the completion of a Project Study Report, the Flood Control District has begun the preparation of construction plans and environmental permits. The long-term vision for Lower Walnut Creek is “A sustainable channel that provides critical flood protection in a way that is more compatible with the plants and animals that call the creek home.”

Land uses in the Walnut Creek watershed consist of 13% agricultural lands; 58% urban lands; and 29% open space, parks and recreation areas, and water.

Walnut Creek has a TMDL for diazinon (SFBRWQCB, 2017).

➤ *San Leandro and Moraga Creek Watersheds*

The current Contra Costa Watershed Stormwater Resource Plan also identifies the upper San Leandro and a total of 13,059 acres of the Upper San Leandro and Moraga Creek watersheds as located within the County. The creeks in this area include Moraga Creek, San Leandro Creek, Laguna Creek, Redwood Creek, Indian Creek, Rimer Creek, Buckhorn Creek, and Callahan Creek. The southern extent of the City of Orinda and a major portion of the Town of Moraga are the local jurisdictions in the watersheds, along with a small portion of unincorporated County area.

Both San Leandro Creek and Moraga Creek flow into the Upper San Leandro Reservoir, which is managed by EBMUD. The reservoir is in both Alameda and Contra Costa Counties, with its outlet in Alameda County. Water discharged from the reservoir flows through Alameda County to the San Francisco Bay. The channels of the creeks throughout the Planning Unit area are relatively unmodified. Large flood control channels have not been built in this region. Moraga Creek has been routed underground in short reaches to accommodate urbanization and infrastructure development.

Land uses in the Upper San Leandro and Moraga Creek watersheds consist of 17% agricultural lands; 30% urban lands; and 53% open space, parks and recreation areas, and water.

The Upper San Leandro Reservoir is 303(d) listed as impaired for mercury. Neither San Leandro Creek nor Moraga Creek are 303(d) listed (SFBRWQCB, 2017).

➤ *Major Drainages and Major Drainage Characteristics and challenges*

The following drainages are identified in the Moraga section of the County-wide Flood Insurance Study (FIS) provided by the Federal Emergency Management Agency (FEMA).

- Moraga Creek
- Ivy Drive Tributary
- Larch Creek

- South Branch Moraga Creek
- Laguna Creek
- Corliss Drive Tributary
- St. Mary's Road Tributary
- Las Trampas Creek
- Rimer Creek

➤ *Storm Sewer System*

The most recent Storm Drain master plan was adopted July 2015. According to the plan, the Town's system is integrated between storm drainpipes, ditches, and creeks. In some instances, creeks are routed through large underground culverts, such as Laguna Creek. The steep terrain transports sediment and debris through the pipe network system which can limit the capacity. Field condition assessment noted that although most of the pipes are in good condition, some of the pipes would benefit from maintenance to remove debris.

➤ *Storm Sewer Challenges (Pertinent to GI)*

All the Town's drainage essentially flows via private creeks after capture in the DI's. Many of the conveyances are on private property that the Town has no jurisdiction over.

➤ *Property Owner coordination / property rights.*

Responsibility extends to the middle of the creek.

<http://www.moraga.ca.us/homepage/property-owners-responsible-for-creeks-and-storm-drains?A=SearchResult&SearchID=15922706&ObjectID=10197443&ObjectType=35>

Storm drain maintenance requires removing debris from inlets, concrete drainage swales, and pipes. The latter may require a professional pipe roter to clear out plugged drains. A poorly maintained creek and private storm drain system can cause a blockage that could potentially cause damage to your property and property owners up and downstream from your location.

➤ *Flood Zones*

Section 4.1 of the **Floodplain Boundaries** section in the current (2017) FIS provided by FEMA states that in order to provide a national standard without regional discrimination, the 1-percent annual chance flood has been adopted by FEMA as the base flood for floodplain management purposes. The 0.2-percent annual chance flood is employed to indicate additional areas of flood risk in the community. For the stream studied in detail, the 1- and 0.2- percent annual chance floodplains have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale and a contour interval as shown on Table 12, "Topographic Map Information."

Section 4.2 of the **Floodways** section in the current (2017) FIS states that the floodways presented in this FIS were computed for certain stream segments based on equal conveyance reduction from each side of the floodplain. Floodway widths were computed at cross sections. Between cross sections, the floodway boundaries were interpolated. The results of the floodway computations are tabulated for selected cross

sections. The computed floodways are shown on the revised FIRM (Published Separately). In cases where the floodway and 1-percent annual chance floodplain boundaries are either close together or collinear, only the floodway boundary is shown.

The area between the floodway and 1-percent annual chance floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 1-percent annual chance flood more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 1, "Floodway Schematic."

Section 2.3 of the **Principal Flood Problems** as described in the current (2017) FIS are limited to ponding behind culverts and other local drainage problems resulting from rainfall. Until recently, Moraga was largely undeveloped, therefore; any flooding that did occur caused little or no damage and went largely unnoticed. The largest floods in the adjacent basin of San Ramon Creek occurred in December 1955 and in January 1963. During those periods, there were no reports of flooding in the developed areas of Moraga. Both storms have an estimated recurrence interval of 25 years.

Hydraulic analysis indicates flooding potential at several locations in Moraga. Flooding is limited to shallow flows at road culverts, where the waters cross the road and then reenter the channel. This shallow flooding occurs on Laguna Creek at Campolindo Drive and Moraga Road, on St. Mary's Creek at Moraga Road, on Corliss Creek at Corliss Drive, and on Larch Creek at Larch Avenue. Laguna Creek, at the upper end of the culvert under Rheem Boulevard, causes flooding in several old homes on the creek banks.

➤ *Flood Control Facilities*

In the 2015 Moraga Storm Drain Master Plan it states that precipitation that falls within Moraga generates stormwater runoff. This runoff is conveyed into many manmade drainage systems that discharge to local creeks that eventually drain to the Upper San Leandro Reservoir, with the exception of Las Trampas Creek, which drains towards Lafayette. Some components of these systems are owned by the Town, while others are private. Determining private/Town ownership is complex and often requires detailed study and legal analysis.

Storm drain systems can interact with one another, and potential improvements to one system may impact the performance of other systems. While most of the Town has traditional curb and gutters, there are some areas that consist of roadside ditches with driveway culverts. This more rural drainage layout tends to attenuate runoff by slowing velocities and creating surface ponding.

In addition to storm drains, creek flood protection is provided to the Town by the Moraga and Laguna Creek systems that convey storm-generated runoff to the Upper San Leandro Reservoir.

Section 2.4 of the Flood Protection Measures in the current FIS study are limited to a section of improved channel with two drop structures on Moraga Creek where it runs through the Moraga Country Club. The structures have little effect on the 1- and 0.2-percent annual chance floods.



➤ *Flood Control Development Policies*

The Town has adopted Section 8.108 Flood Hazard Area Regulations. The purpose of this section is to promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas by legally enforceable regulations applied uniformly throughout the community to all publicly and privately-owned land within flood prone areas.

➤ *Storm Sewer Opportunities (Pertinent to GI)*

Storm Sewer Opportunities are limited for the Town as the system has direct connections to creeks and conveyances on private property.

➤ *Recent and Planned Drainage Improvements*

In the 2015 Storm Drain Master Plan, the Town of Moraga describes working to alleviate inadequacies in the existing storm drain system by making system improvements. Some recent activity has focused on:

1. Planning and design of the Hacienda Pavilion creek daylighting project,
2. Design and construction of new headwall at Hacienda Pavilion,
3. Patch repair of 96-inch Rheem Shopping Center culvert,
4. Annual maintenance of catch basins, and
5. 2008 Storm Drain Needs Study that documented problem areas within the creek culvert system and inspection of corrugated metal pipes that were 36-inch or greater in diameter

The 2018-2023 Five Year Capital Improvement Program for the Town of Moraga includes planning for the Laguna Creek Restoration at Hacienda de las Flores Project. In 2017, the Town garnered two grants and is waiting for results of a third grant to remove an existing 8-foot culvert pipe and to create a channel to meander like a natural stream adjacent to the Pavilion building at the Hacienda de las Flores grounds. Although the two approved grants will allow for the project to proceed with modest improvements, the third grant will allow for flexibility to add enhancements. Benefits of this project include:

1. Funding one of the High Priority projects identified in the Storm Drain Master Plan;
2. Eliminate maintenance and replacement costs related to a piped system;
3. Provide enough capacity to convey the 100-year storm event;
4. Prevent flooding to the Pavilion building;
5. Create a natural amenity to the public with educational opportunities;
6. Improve views from Moraga Road; and
7. Encourage California red-legged frog habitat by creating aquatic habitat.

➤ *Funding for Maintenance and for Capital Improvements*

On June 27, 2018 the Town Council adopted the FY 2018/19 operating budget and capital improvement program. The capital improvement program totals \$9.45 million and includes funding for the pavement management program and Canyon Bridge replacement. \$245,000 in funding was approved to augment the Town's Storm Drain Maintenance program. The budget is focused on holding the line on expenses, improving efficiencies and funding vital infrastructure improvements. The budget does not include much

needed investment in the Town's infrastructure (streets, storm drains, facilities and parks). This shortfall is estimated to be \$1.5 million annually. The Town will be working to identify a strategy to deal with this structural deficit in the coming year.

<http://www.moraga.ca.us/news-1/fy-2018-19-operating-and-capital-improvement-program-budgets?A=SearchResult&SearchID=15922606&ObjectID=10136620&ObjectType=35>

### 1.3.3 Related Regional and Countywide Plans and Planning Documents

This Plan has been coordinated with the following regional stormwater documents:

- The Contra Costa Watersheds Stormwater Resource Plan (CCW SWRP). The CCW SWRP was funded by State Water Resources Control Board under a Proposition 1 Grant, with matching contributions provided by Contra Costa municipalities individually and collectively through the Contra Costa Clean Water Program (CCCWP). The CCW SWRP identified and prioritized potential multi-benefit stormwater management projects, including green infrastructure projects in watersheds and jurisdictions throughout Contra Costa County. Projects identified within the CCW SWRP are eligible to apply for future state funding. Many of the projects included in this Plan were drawn from the CCW SWRP project opportunity lists.



- The Contra Costa Countywide Reasonable Assurance Analysis (RAA). The RAA for Green Infrastructure is being prepared by Contra Costa municipalities collectively through the CCCWP and is consistent with guidance prepared by the Bay Area Stormwater Management Agencies Association (BASMAA). The RAA for Green Infrastructure uses a water quality model coupled with continuous simulation hydrologic output to estimate baseline loadings of pollutants and the reductions that might be achieved through green infrastructure implementation in 2020, 2030, and 2040 under various scenarios, which include implementation of projects identified in this Plan. Results pertinent to green infrastructure planning and implementation are discussed in Section 2 of this Plan.

➤ *Further discussion of the relationship of the Green Infrastructure Plan to Additional Regional and Countywide Related Local Planning Document*

The City of San Pablo and the City of Richmond have embarked on a Grant Application for Alternative Compliance/Water Quality Trading in Contra Costa County. As of this writing the status of the grant success is unknown.

➤ *Provision C.3.j.i.(2)(h); TRT Item 16*

Green infrastructure can be integrated into a wide variety of public and private projects. Public projects can incorporate green infrastructure in streets, parks, schools, and other civic properties. In order to ensure that green infrastructure is considered and supported in the range of planning and design processes for these projects, the Town has reviewed and/or updated the following planning documents to appropriately incorporate green infrastructure requirements:

Table 1. Documents Updated to Align with this Green Infrastructure Plan		
Document	Summary of Updates	Completion Date
General Plan	Last updated 4/11/18	2018
Moraga Center Specific Plan	NA	1/27/10
Standard Details and Specifications	Under CC Program	June 30, 2019
Climate Action Plan	NA	10/22/14
Moraga Bike/Walk Plan	NA	10/26/16
Storm Drain Master Plan	Underway	2020

#### 1.3.4 Outreach and Education

The Town's Green Infrastructure Plan development process engaged a wide variety of stakeholders, including both government staff and community members who will live, work, and play near future green infrastructure projects. The Town also intends to engage relevant government staff and community members as projects move forward towards design and implementation.

- The Town's GI efforts have been ongoing since 2016 as reported in the 2015-2016 Annual Report. On May 25, 2016, Town staff made a presentation to the Town Council on the Requirements of MRP 2.0 for Trash Load Reduction and for Green Infrastructure (GI). The requirements of GI in the MRP were presented including the GI Plan and Early Implementation requirements. The Council action to provide direction to staff to proceed with preparation of a Green Infrastructure Plan and actions for Early implementation of Green Infrastructure projects was approved unanimously.
- In 2017, Town staff presented the Green Infrastructure Framework Document to the Town Council at a regularly scheduled public meeting. The Document was duly considered, approved and reported on in the 2016-2017 Annual Report.
- September 26, 2018 – as noted in the workshop/summary attendance sheet in the CCCWP group report; the Town's on-call stormwater consultants participated in the Green Infrastructure Planning Workshop for Permittees.
- Staff participation in regional processes to promote Green Infrastructure (such as the regional roundtable and design charrette).
- The Town will participate in a countywide interagency process, convened by the CCCWP, to facilitate excellence and consistency in the design and construction of Green Infrastructure features and facilities.

The Town will:

- Share with other Contra Costa municipalities, through the CCCWP, conceptual, preliminary, and final plans and specifications developed for Green Infrastructure projects.
- Identify significant Green Infrastructure projects and issues encountered during design and construction of those projects and bring those projects and issues forth in online forums and in-person interagency workshops and meetings.
- Participate in evaluation and recommendation of design details and specifications for Green Infrastructure, where doing so furthers the purposes of countywide consistency and cost-efficiency, and quality of the built facilities.
- Participate, as a reviewer, in the drafting and updating of a Green Infrastructure Design Guide, the purpose of which will be to assist capital improvement projects staff in Contra Costa municipalities throughout the steps of project identification, evaluation, design, and construction.

### ***1.3.5 Policies, Ordinances, and Legal Mechanisms***

- With Resolution No 47-2017, on May 24, 2017, the Town Council approved the Green Infrastructure Framework and directed staff to proceed with the preparation of the Green Infrastructure Plan.
- This Green Infrastructure Plan was subsequently implemented by a Green Infrastructure Design Policy memorandum on August 30, 2019 issued by the City Engineer under his Administrative Authority.

## 2 Green Infrastructure Targets

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Provisions C.11 and C.12 in the MRP require Contra Costa Permittees (Contra Costa County and its 19 cities and towns) to reduce estimated PCBs loading by 23 grams/year and estimated mercury loading by 9 grams/year using green infrastructure by June 30, 2020. Regionally, Permittees must also project the load reductions achieved via green infrastructure by 2020, 2030, and 2040, showing that collectively, reductions will amount to 3 kg/year PCBs and 10 kg/year mercury by 2040.



This planning process developed and assessed projections for the square footage of impervious surface to be retrofitted and treated with green infrastructure from private projects within the Town's jurisdiction by 2020, 2030, and 2040. It also incorporates targets for the square footage of impervious surface to be retrofitted and treated with green infrastructure through potential public projects within the Town's jurisdiction by 2020, 2030, and 2040.

### 2.1 Countywide Attainment Scenario

A "Countywide Attainment Scenario" was modeled as part of the RAA modeling to help Permittees with their GI Planning. The Contra Costa Countywide Reasonable Assurance Analysis (RAA), summarized in the Geosyntec Consultants memo to the CCCWP dated August 7, 2019, attached as Appendix B, focused on PCBs while also evaluating opportunities for mercury reduction. The results of this analysis demonstrate that the public GI retrofit opportunities with the highest potential to reduce PCBs loads are concentrated within a small subset of Contra Costa Permittee area due to the pattern of pre-1980 industrial development within the region. Conversely, many Contra Costa Permittees have no or very few opportunities to contribute significantly toward achievement of PCBs loading reductions via implementation of GI in their communities.

Given the findings, it is likely that a countywide strategy would be the most efficient and effective way to achieve the PCB load reduction goals. However, a preliminary review of the legal and administrative requirements involved with implementing a countywide strategy indicates that they are complex and would require considerable effort to resolve. Additionally, it would require comprehensive dialogue in the public forum lead by the elected officials and ultimately overall agreement which is beyond the scope of this plan.

For the purposes of creating the local GI Plan, Town of Moraga prioritized their GI projects based on achieving other multiple benefits including controlling other stormwater pollutants, preserving and enhancing local stream hydrology, reducing localized flooding, increasing the resiliency of water supply, ancillary benefits that derive from adding landscaped areas within the urbanized environment, and mitigating the urban heat island effect.

## 2.2 Private Development Projections

To forecast private development, the Town participated in a regional process coordinated through the CCCWP and shared with BASMAA member agencies. This process utilized the outputs of UrbanSim, a model developed by the Urban Analytics Lab at the University of California under contract to the Bay Area Metropolitan Transportation Commission (MTC). UrbanSim is a modeling system developed to support the need for analyzing the potential effects of land use policies and infrastructure investments on the development and character of cities and regions. The Bay Area’s application of UrbanSim was developed specifically to support the development of Plan Bay Area, the Bay Area’s Sustainable Communities planning effort.

MTC forecasts growth in households and jobs and uses the UrbanSim model to identify development and redevelopment sites to satisfy future demand. Model inputs include parcel-specific zoning and real estate data; model outputs show increases in households or jobs attributable to specific parcels. The methods and results of the Bay Area UrbanSim model have been approved by both MTC and Association of Bay Area Government [ABAG] Committees for use in transportation projections and the regional Plan Bay Area development process.

The CCCWP process used outputs from the Bay Area UrbanSim model to map parcels predicted to undergo development or redevelopment in each Contra Costa jurisdiction at each time increment specified in the MRP (2020, 2030, and 2040). The resulting maps were reviewed by local staff for consistency with the Town’s local knowledge and local planning and economic development initiatives. The maps were revised, and each revision documented.

It is assumed that multifamily residential and commercial/industrial developments will incorporate stormwater treatment facilities (typically bioretention) in accordance with MRP Provisions C.3.b., C.3.c., and C.3.d. Because of high land values, it is expected that more than 50% of the existing impervious area in each parcel will be replaced if a parcel is developed, and therefore the entire parcel will be subject to Provision C.3 requirements (that is, will be retrofit with Green Infrastructure), consistent with the “50% rule” requirements of MRP Provision C.3.b.

Existing impervious surface for each affected parcel was estimated using the 2011 National Land Cover Database. Estimates were spot-checked and revised based on local knowledge and available satellite imagery.

Based on these assumptions and the revised maps, the amounts of existing impervious surface forecast to be retrofit with green infrastructure via private development are as shown in Table 2.

Year	Total Square Footage
2020	3,335
2030	10,947
2040	300,876

### 2.3 Targets for Public Projects

Forecasted impervious surface to be retrofit via public projects is in two categories:

1. Estimated tributary impervious surface for Green Infrastructure Projects identified in this Plan.
2. Additional tributary impervious surface associated with projects yet to be identified. These projects are associated with general geographic areas (neighborhoods or blocks) but specific facility locations have not yet been identified.



These forecasts are summarized in Table 3.

Year	Square footage tributary to GI Projects included in this Plan	Additional square footage associated with projects yet to be identified	Total
2020	34,172	0	34,172
2030	10,382	0	10,382
2040	0	1,080,172	1,080,172

### 2.4 Projected Load Reductions

As part of the RAA process, the estimates of projected private development (described in Section 2.2) and the general and specific locations of public projects (summarized in Section 2.3 and detailed in Chapter 3) will be incorporated into a water-quality model and projected pollutant load reductions will be developed for 2020, 2030, and 2040. Details of methods, inputs, and model outputs will be included in the RAA report.

## 3 Public Project Identification, Prioritization, and Mapping

### 3.1 Tools for Public Project Identification and Prioritization

The Town of Moraga utilized many tools to identify and prioritize potential public projects. The first process was the Contra Costa Watersheds Stormwater Resource Plan described briefly below.

➤ *CCW SWRP Overview*

The Contra Costa Watersheds (CCW) Stormwater Resource Plan (SWRP) was created to help build stormwater management projects and programs within Contra Costa County (County). The plan builds upon a foundation of support for and successful implementation of watershed protection programs, restoration projects, and low impact development throughout the County.



The CCW SWRP forms a connection between regional water quality and water resources planning goals. The CCW SWRP identifies projects that can support municipal GI planning and implementation driven by water quality regulations. The CCW SWRP also reflects the goals of and will be incorporated into Integrated Regional Water Management (IRWM) plans within the County, providing a link between stormwater and management of other water resources. The implementation of multiple benefit CCW SWRP projects will help protect and improve water bodies in the County, which provide important environmental, community, health, and economic benefits within the County. CCW SWRP also represents progress towards treating stormwater as a valuable local water resource.

The process for identifying project opportunities and then selecting ten potential projects for concept development is outlined below.

1. Identify projects – Potential projects were provided by the Permittees and other CCW SWRP stakeholders. Additional potential project locations were identified and catalogued using a geographic information system (GIS)-based opportunity analysis.
2. Score projects using an automated metrics-based evaluation – The CCW SWRP used a quantitative metrics-based multiple benefit evaluation, as required by the Storm Water Resource Plan Guidelines (SWRP Guidelines, SWRCB, 2015), to score potential projects. Multiple benefits evaluated included water quality, water supply, flood control, environmental and community benefits of projects. The scoring was automated using metrics based on available project attributes. These scores were then used to preliminarily rank the projects for each jurisdiction.
3. Rank projects based on input from CCCWP Permittees and the Technical Advisory Group (TAG) – Using the project scores along with other institutional knowledge, the CCCWP, jurisdictions, and Contra Costa Watersheds ES-7 August 2018 DRAFT Stormwater Resource Plan the TAG provided input on project ranking and prioritization of projects as required by the SWRP Guidelines.



4. Develop Project Concept Designs – Ten projects were selected for development of concept designs showing the project footprint, stormwater treatment facilities, projected PCBs and mercury load reductions and other benefits, and a cost estimate. The Town of Moraga’s Linda Drive bio-retention project is included in the list.

➤ **Development of Initial Project Opportunity Lists**

The Town of Moraga developed its project based the ability of a project to be built in the location and provide meaningful treatment.

The Contra Costa Clean Water Program (CCCWP) led the development of the CCW SWRP, on behalf of Contra Costa County Flood Control and Water Conservation District (Flood Control District), unincorporated Contra Costa County, the 19 incorporated cities and towns within Contra Costa County (Permittees), and other stakeholders. The CCW SWRP development involved a robust outreach program to engage and solicit feedback from the County’s well-organized and empowered community groups and the public. A Technical Advisory Group (TAG), made up of representatives from state, regional, and local agencies as well as stakeholder groups, was also established to help guide the CCW SWRP development. The stakeholder developed potential project by gathering the following information for the SWRP:

- Facility Name
- Location with APN or GPS coordinates
- Facility size and or volume
- Other information such as assessment of benefits, the stage of planning/completion date and other descriptive information

➤ **Stakeholder Engagement Process**

The development of a successful CCW SWRP required the coordination and collaboration among municipalities, special districts, NGOs, other stakeholders within the County and the public, as well as government agencies, to gather data, identify project opportunities, and ensure that local goals and values are reflected in the document. A group of technical advisors, representing municipalities, watershed advocacy and planning groups, and disadvantaged communities was assembled into a technical advisory group (TAG) to help guide the development of the CCW SWRP. This section describes the roles of cooperating entities, the TAG, supporting entities, and the public as well as the CCW SWRP’s relationship with existing and anticipated planning documents. Specific public education and outreach activities that were conducted during the CCW SWRP development process.

➤ **Project Opportunity Identification Tool**

A desktop project opportunity analysis was conducted in a GIS platform to identify opportunity locations for GI projects. The desktop GIS analysis entailed screening for publicly owned parcels and rights-of-way (ROW) without physical feasibility constraints that would preclude implementation of a GI project. The process for identifying additional projects was as follows:

1. Identify publicly owned parcels
2. Screen identified publicly owned parcels

3. Identify right of way
4. Identify land uses
5. Screen all identified locations for physical feasibility

The projects identified through the GIS opportunity analysis and stakeholder GI projects process were categorized as parcel-based, regional, or ROW/green street projects.

➤ *CCW SWRP criteria for selecting/scoring multi-benefit projects*

The SWRP Guidelines require an assessment of water quality, water supply, flood management, environmental, and community benefits of potential CCW SWRP projects. The SWRP Guidelines divide these benefit categories into “main” and “additional” benefits.

Category	Main Benefit	Additional Benefit
Water Quality	<ul style="list-style-type: none"> <li>• Increased filtration and/or treatment of runoff</li> </ul>	<ul style="list-style-type: none"> <li>• Nonpoint source pollution control</li> <li>• Reestablished natural water drainage and treatment</li> </ul>
Water Supply	<ul style="list-style-type: none"> <li>• Water supply reliability</li> <li>• Conjunctive use</li> </ul>	<ul style="list-style-type: none"> <li>• Water conservation</li> </ul>
Flood Management	<ul style="list-style-type: none"> <li>• Decreased flood risk by reducing runoff rate and/or volume</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced sanitary sewer overflows</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>• Environmental and habitat protection and improvement</li> <li>• Increased urban green space</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced energy use, greenhouse gas emissions, or provides a carbon sink</li> <li>• Reestablishment of the natural hydrograph</li> </ul>
Community	<ul style="list-style-type: none"> <li>• Employment opportunities provided</li> <li>• Public education</li> </ul>	<ul style="list-style-type: none"> <li>• Community involvement</li> <li>• Enhance and/or create recreational and public use areas</li> </ul>

Using the information compiled in the identified project opportunity database, each project received a score using the point system. A description of each scored project component is provided below:

**Parcel area** (for regional and parcel-based GI projects only) – This scoring component awarded more points for larger parcels, as it is easier to site a project on a larger parcel.

**Slope** – This scoring component is related to ease of construction and implementation. Flatter locations typically require less grading and hydraulic connection considerations and received more points.

**Infiltration feasibility** – More points were awarded to projects that overlie infiltrating soils, as retention of runoff through infiltration provides enhanced pollutant reduction, reestablishment of natural drainage, groundwater aquifer recharge potential, and reduction of runoff rates, among other beneficial outcomes.

**PCBs/mercury yield classification in project drainage area** – This scoring component is related to the influent TMDL pollutant loads. Facilities that are in areas with higher pollutant loading rates for PCBs and mercury have greater potential to reduce pollutant loads. An additional point was awarded to projects with a property within its assumed drainage area that is known to be a source of elevated PCBs loads to the storm drain system.

**Removes pollutant loads from stormwater** – Points were awarded to facilities designed as green infrastructure or treatment control facilities. More points were awarded to partially and fully infiltrating green infrastructure projects than non-infiltrating projects, as infiltration increases pollutant load reduction. An additional point was awarded for regional projects, as these projects would remove a larger pollutant load than a parcel-based or ROW project.

**Augments water supply** – Increasing points were awarded based on potential water supply provided. Projects located over infiltrating soils and overlying potential water supply aquifers that promote infiltration were given one point, while projects that are specifically designed to augment water supply were given two points.

**Provides flood control benefits** – Flood control facilities received points specific to providing flood control benefits. Green infrastructure projects (fully or partially infiltrating) were assumed to provide some flood control benefits, while projects specifically designed to address flooding issues were given more points.

**Re-establishes natural water drainage systems or develops, restores, or enhances habitat and open space** – Hydromodification control, stream restoration, and habitat restoration projects received points specific to providing these environmental benefits. Fully and partially infiltrating green infrastructure projects were given one point for providing hydrologic benefit.

**Provides community enhancement and engagement** – Projects that specifically provide public use areas or public education components with potential opportunities for community engagement and involvement were given points specific to providing community benefits.

➤ **Additional criteria used by municipal staff**

Staff also considers cost-benefit as part of the “buildability” of the projects

➤ **Integration with Storm Drain Master Plan**

The Town is undertaking a revision of the Storm Drain Master Plan that was developed in 2015. As stated earlier most storm drain lines connect directly to creeks and waterways that are on private property. However, the GI Design Policy memorandum will be in force for this planning work.

- **Integration with Capital Improvement Project planning process**  
 All project proposals are evaluated in the context of the Town priorities. The highest priority is the maintenance of current facilities. After that new project proposals are evaluated based on funding available and the use of dedicated or restricted funding.
  
- **Integration with Complete Streets and other transportation planning processes**  
 Where funding and right of way opportunities present themselves, green infrastructure will be examined for incorporation into transportation projects.

### 3.2 Maps and Project Lists

The table shown below provides the project currently determined by the Town to be feasible for inclusion in this GI Plan. Associated maps are included in Appendix A.

Table 5: Town of Moraga Proposed GI Projects			
Description	2020	2030	2040
Livable Moraga Road - Corridor Plan and Improvements			X
St Mary's Road / Rheem Boulevard / Bollinger Canyon Road Roundabouts – Design	X		
St Mary's Road / Rheem Boulevard / Bollinger Canyon Road Roundabouts – Construction		X	
Moraga Way and Canyon/Camino Pablo Improvements	X		

## 4 Early Implementation Projects

### 4.1 Review of Capital Improvement Projects

MRP Provision C.3.j. ii. requires that the Town must prepare and maintain a list of public and private green infrastructure projects planned for implementation during the 2015- 2020 permit term, and public projects that have potential for green infrastructure measures. The Town submitted an initial list with the FY 15-16 Annual Report to the RWQCB and updated the list in the FY 16-17 and FY 17-18 Annual Reports.

The creation and maintenance of this list is supported by guidance developed by BASMAA: “Guidance for Identifying Green Infrastructure Potential in Municipal Capital Improvement Projects” (May 6, 2016). The BASMAA Guidance is attached to this document as Appendix F.

*“The Town submitted an initial list with the FY 15-16 Annual Report to the RWQCB and updated the list in the FY 16-17 and FY 17-18 Annual Reports.”*

### 4.2 List of Projects Identified

CIP Projects with Green Infrastructure potential that were identified during 2015-2019 are listed in Table 6, along with their status.

Project Name	Description	Potential Tributary Impervious Area (SF)	Project Status	Included in Green Infrastructure Plan (Y/N)
Rheem Boulevard Landslide Repair & Repaving	Repair the landslide below Rheem Boulevard between St. Mary's Road and Moraga Road, and repave as required.	NA	Design	No – The project is to repair a landslide in stages in conjunction with the Rancho Laguna subdivision.
Laguna Creek Restoration at Hacienda de las Flores	Develop plans, specifications, and cost estimate for improvements to Laguna Creek	NA	Design	No – The project is to daylight a culverted creek on the Hacienda property
St Mary's Rd/Rheem/Bollinger Canyon Roundabouts	Construct new roundabout at intersection of Rheem Boulevard and St. Mary's Road and relocate trail to create safer pedestrian and bicycle crossing.	106,722	Design	Yes

Moraga Center Pedestrian & Bicycle Improvements	Study for proposed sidewalks and pedestrian path facilities to close critical gaps, install bike facilities and streetscape improvements along streets in Moraga	NA	Planning phase	TBD
Bollinger Canyon Road Hillside Stabilization	Stabilize hillside on Bollinger Canyon Road.	NA	Temporary repair complete – Permanent repairs are pending (funding)	TBD
Trash Load Reduction Program	Reduce trash load from the Town's Municipal Separate Storm Sewer Systems (MS4s) by installing Full Trash Capture Devices in existing storm drain system	NA	Ongoing upgrade work	TBD
Livable Moraga Rd. – Corridor Plan and Improvements	Plan and develop alternatives for Moraga Rd. for use by all modes of transportation.	NA	Planning phase	TBD
Moraga Way and Canyon/Camino Pablo Improvements	Improvements to the Bicycle/Pedestrian network as well as improvements to multiple intersections designed to improve pedestrian safety.	22,100	Planning Phase	Yes
Pavement Management Program	Annually review Pavement Management System analysis, assess current needs, and allocate appropriate funds to provide cost-effective pavement maintenance.	NA	Ongoing Roadway maintenance/resurfacing program	No
Livable Moraga Road - Corridor Plan and Improvements	Improve bicycle, pedestrian, and vehicular safety and mobility along	TBD	Planning / Design /Potential Future Project	Yes

	Moraga Road between the Moraga Center and Campolindo			
Moraga Pedestrian & Bicycle Master Plan (MPBP) Update	Complete comprehensive update of 2004 MPBP, to identify needed bicycle and pedestrian facilities improvements Town-wide including implementation	NA	Planning phase	No
Minor Capital Improvement Program (Annual)	Provide funding for numerous minor capital improvements at Town facilities.	NA	For unplanned repairs/purchases as needed	No
Canyon Road Bridge Replacement	The bridge is in need of structural rehabilitation and reconfiguration to address a safety issue for pedestrians and bikes due to the current deck geometry.	NA	Design	No
ADA Self-Evaluation Plan (Phase 1: ROW)	Comply with Title II of the Americans with Disabilities Act (ADA) to evaluate the Town's right-of-way, facilities, and programs.	NA	Planning phase	No
Street Light Master Plan	Determine, prioritize, and estimate capital improvement needs of the Town's streetlight system.	NA	Planning phase	No
Minor Traffic Safety Program (Annual)	This program is intended to provide traffic engineering services to complete minor traffic safety improvements.	NA	For unplanned repairs/purchases/upgrades as needed	No
Storm Drain Master Plan	Determine, prioritize, and	NA	Planning phase	No

	estimate capital improvement needs of the Town's storm drain collection system.			
Minor Corrugated Metal Pipe Repair Program	Repair various culvert crossings and connections to creeks made predominately of corrugated metal pipe that are at the end of their life cycle.	NA	For unplanned repairs or scheduled maintenance/replacement as needed	No
Hacienda Building ADA Accessibility to Upper Floors	Provide ADA accessibility to the 2nd and 2.5th floors of the Hacienda building.	NA	Planning phase	No
Hacienda de las Flores Improvement Program	Provide minor improvements to the Hacienda buildings aimed at improving customer safety and enjoyment.	NA	Planning phase	No
Moraga Road (St Mary's - Draeger) Resurfacing	Resurface Moraga Road from St Mary's Road to Draeger Drive.	NA	Design	No
Moraga Road Pedestrian Improvements	Construct pedestrian improvements along Moraga Road to improve route from Rheem Elementary to Las Perales School.	NA	Under Construction	No
Municipal Wayfinding Signage Program	Develop a comprehensive vehicular, pedestrian, bicycle wayfinding signage program.	NA	Construction phase	No
PG&E Undergrounding	Underground overhead utilities along portions of Moraga Road.	NA	Ongoing	No
Commons Park Master Plan Update	Complete a comprehensive site-specific Commons	NA	Planning phase	No



	Park Master Plan, which was a part of the 2007 Parks & Recreation Master Plan (Town-wide).			
Commons Park Sand Volleyball Court Renovation	Reduce annual maintenance and eliminate ponding of the sand volleyball area.	NA	Repair work completed	No
Minor Improvements to Government Facilities Program	Minor improvements on government facilities to accommodate growing population from new development.	NA	For unplanned repairs/purchases as needed	No
Moraga Library HVAC System Replacement	Replace Library HVAC system, which is at the end of its life cycle and showing signs of disrepair.	NA	Under Construction	No
Municipal Monument Gateway Signage Program	Study to replace four existing gateway signs along arterial roads new the Town limits.	NA	Planning phase	No
Sinkhole Repair on Rheem Boulevard at Center Street	Repair the damaged 96-inch and 27-inch storm drain pipes and associated improvements to the intersection.	NA	Ongoing repair work	No
Commercial Centers Street lighting	Determine, prioritize, and estimate capital improvement safety and street lighting needs at the two commercial centers in Town.	NA	Planning phase	No
ADA Compliance Streets Program	Provide ADA accessible sidewalks and curb cuts.	NA	Ongoing upgrade work	No
Commercial Centers Streetlighting	Determine, prioritize, and estimate capital improvement safety and street lighting	NA	Planning phase	No

	needs at the two commercial centers in Town.			
Storm Drain Funding Initiative	Generate storm drain funding to address operation, maintenance, and improvements as identified in the adopted Storm Drain Master Plan.	NA	Planning phase	No
Commons Park Improvement Program	Provide minor park improvements aimed at improving customer safety and enjoyment.	NA	For unplanned repairs/purchases as needed	No
Lamorinda All-Access Playground at Moraga Commons	Install all-access playground designed for children with special needs.	NA	Under Construction	No
Canyon Road Bridge Reopening	Reopen Canyon Road after its closure on April 18, 2017 due to structural damage from adjacent moving landslide.	NA	Under Construction	No
Central Video Surveillance System	Conduct pilot surveillance camera program to determine if expansion to five (5) key locations at the Town limits is warranted.	NA	Under Construction	No
Art in Public Spaces Program	Install public art in accordance with direction of the Art in Public Spaces Committee.	NA	Planning phase	No
Hillsides and Ridgelines Regulations Update	Update ordinance and regulations for development and preservation of hillsides and ridgelines.	NA	Planning phase	No
Information Technology Infrastructure Program	Provide Information Technology (IT) infrastructure that supports the	NA	Ongoing asset replacement	No

	efficient and effective operation of Town business.			
Vehicle & Operating Equipment Program	Provide reliable Town vehicles and operating equipment to prevent disruption in service and to minimize excessive maintenance costs.	NA	Ongoing asset replacement	No

**4.3 Workplan for Completion**

The Livable Moraga Road – Corridor Plan and Improvements project is currently in the preliminary planning phase with \$440,000 in studies being invested to date.

The St Mary’s/Rheem/Bollinger Canyon Roundabouts project is in preliminary design with a goal of 35% plans by 2020. Those plans will be used to seek construction funding. It is included in the CIP as a future project pending a funding opportunity. It has a construction goal of 2030.

The Moraga Way and Canyon/Camino Pablo Improvements project is scheduled to be completed by 2020.

## 5 Tracking and Mapping Public and Private Projects Over Time

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### 5.1 Tools and Process

The CCCWP has developed a county-wide GIS platform for maintaining, analyzing, displaying, and reporting relevant municipal stormwater program data and information related to MRP Provisions C.10 (trash load reduction activities) and C.11/C.12 (mercury and PCBs source property identification and abatement screening activities). This tool is also used to track and report on GI project implementation.

The CCCWP's stormwater GIS platform features web maps and applications created using ESRI's ArcGIS Online (AGOL) for Organizations environment, which accesses GIS data, custom web services and reports that are hosted within an Amazon cloud service running ESRI's ArcGIS Server technology.

The *C.3 Project Tracking and Load Reduction Accounting Tool* within the CCCWP AGOL system is used to track and report on GI project implementation. It is currently used to track and map existing private and public projects incorporating GI; in the future it may also be used to map planned projects and will allow for ongoing review of opportunities for incorporating GI into existing and planned CIPs. The AGOL system can be used to develop maps that can be displayed on public-facing websites or distributed to the public. These maps can be developed to contain information regarding the GI project data input into the AGOL system.

The *C.3 Project Tracking and Load Reduction Accounting Tool* is intended to be used to allow for estimates of potential project load reduction for PCBs and mercury and presently supports the BASMAA Interim Accounting Methodology for certain load reduction activities. In the future, the tool is planned to be updated with the RAA methodology developed for the County. That functionality is planned to be active by the end of the current permit term.

The Town actively engages with the AGOL tool and maintains up-to-date Town project data. The Town currently conducts updates of the AGOL tool at an annual frequency.

## 6 Design Guidelines and Specifications

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### 6.1 Guidelines for Streetscape and Project Design

When determining design elements to be included in streetscape improvements and complete streets projects, project managers and designers will consult the National Association of City Transportation Officials (NACTO) Urban Street Stormwater Guide, the San Mateo County Sustainable Green Streets and Parking Lots Design Guidebook, and other resources available on the CCCWP website.

<https://www.cccleanwater.org/construction-business/green-infrastructure/resources>

### 6.2 Specifications and Typical Design Details

LID features and facilities will be designed and constructed in accordance with the applicable specifications and criteria in the Contra Costa Clean Water Program's Stormwater C.3 Guidebook. Additional details and specifications, as may be needed for design of street retrofit projects, may be adapted from the San Francisco Public Utilities Commission Stormwater Requirements and Design Guidelines Appendix B (Green Infrastructure Details), the Central Coast Low Impact Development Institute Bioretention Standard Details and Specifications, or other resources compiled by the CCCWP and available through their website.

### 6.3 Sizing Requirements

The Town of Moraga uses the sizing guidelines generated by the Bay Area Stormwater Management Agencies Association (BASMAA) report, [Guidance for Sizing Green Infrastructure Facilities in Street Projects](#), attached as Appendix D.

➤ *Description of "single approach" to GI sizing prepared through BASMAA*

MRP Provision C.3.d contains criteria for sizing stormwater treatment facilities. Facilities may be sized for flow, volume, or a combination of flow and volume. With adoption of the 2009 MRP, a third option for sizing stormwater treatment facilities was added to Provision C.3.d. This option states that "treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80 percent of the total runoff over the life of the project, using local rainfall data." This option can also be used to develop sizing factors for facilities with a standard cross-section (i.e., where the volume available to detain runoff is proportional to facility surface area). To calculate sizing factors, inflows, storage, infiltration to groundwater, underdrain discharge, and overflows are tracked for each time-step during a long-term simulation. The continuous simulation is repeated, with variations in the treatment surface area, to determine the minimum area required for the facility to capture and treat 80% of the inflow during the simulation.

## 7 Funding Options

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### 7.1 Funding Strategies Developed Regionally

The Town of Moraga is committed to the implementation of green infrastructure in future development, but also in retrofitting the existing infrastructure to move away from existing “gray” infrastructure. To that end the Town will be working collaboratively with its co-permittees in the pursuit of funding and project opportunities that are aimed at creating green infrastructure. The primary purpose in participating in the Contra Costa Watersheds Stormwater Resources Plan (SWRP) development was to be eligible for state grant funds by having all potential projects in the SWRP. The BASMAA Roadmap for Funding of Sustainable Streets will be an important tool in the quest for funding.

BASMAA’s “Roadmap for Funding of Sustainable Streets”, April 2018 states:

(The) “Roadmap, was developed to identify and remedy obstacles to funding for Sustainable Street projects, which are defined as projects that include both Complete Street improvements and green stormwater infrastructure, and that are maintained in a state of good or fair condition. The specific actions included in the Roadmap are designed to improve the capacity – both statewide and in the San Francisco Bay Area -- to fund Sustainable Street projects that support compliance with regional permit requirements to reduce pollutant loading to San Francisco Bay, while also helping to achieve the region’s greenhouse gas reduction targets.

“To date, Sustainable Streets have faced funding obstacles due to the restrictions of various funding programs – which may not recognize the potential for overall cost savings that local agencies may achieve through multi-benefit Sustainable Streets projects. Some transportation grants may fund only some aspects of a Sustainable Street project, while resource grants may fund other aspects – and assembling multiple funding sources brings new challenges and costs to a project.

“Over the next 20 to 30 years, cities throughout the Bay Area, and in other parts of California, are required to invest in widespread construction of infrastructure projects that remove pollutants from stormwater runoff, in order to achieve water quality goals for San Francisco Bay. The cost is anticipated to parallel the costs to meet similar requirements in other parts of the state. For example, City of Los Angeles alone, over the next 20 to 30 years, has estimated that \$7 to \$9 billion dollars will be needed to implement the city’s Water Quality Compliance Master Plan for Urban Runoff (Farfaring and Watson 2014). Sustainable Streets are designed to cost effectively deliver multiple benefits, including climate change mitigation, air quality improvement, water quality improvement, localized flood control, and community benefits.

(The) “Roadmap presents specific actions intended to ease the financial burden local governments are facing by maximizing available resources and/or identifying new funding streams. The specific actions to fund Sustainable Streets are scheduled for the following timeframes:

- Immediate actions, such as addressing Sustainable Streets in grant solicitations
- Short-term actions, such as reviewing policies for better ways to fund Sustainable Streets
- Long-term solutions, including legislative engagement and/or advocacy regarding Sustainable Street”

## 7.2 Local Funding Strategies

It is noted that per the Permit Requirements, the sources of funding which the Town is currently pursuing or will pursue for GI Project development should include an evaluation of prioritized funding options, including, but not limited to, alternative compliance funds, grant monies, new taxes and other levies, and other municipal/Permittee resources.

A first step to evaluating potential local funding strategies would be to work with the CCCWP to investigate the legislative constraints for the use of Contra Costa Transportation Authority sales tax revenue. An initial review indicates that the language of Public Utilities Code Division 19, Chapter 1, Section 180001 (e) stating that the funding is "...to be used to supplement and not replace existing local revenues for transportation purpose" would seem to exclude a Clean Water Act purpose of using the funds used for green infrastructure in conjunction with the pavement maintenance mandate. A second step would be to get a ruling from MTC if the Highway User Gas Tax Account (HUTA), Street and Highways Code Section 2101, could be used for Green Infrastructure. Those are the top priorities.

To fund projects, they are recommended for consideration based on the needs of the various operating departments and divisions (Entities). Each Entity is to provide a prioritized list along with any funding or grant information that may applicable. This is important because all projects compete for scarce funds. General Fund money is typically not available to any Capital Projects as those funds are dedicated to the operation of the general government, including Police operations.

Given the various sources of funds, projects are ranked by 1. Health and safety need, 2. Maintenance of current facilities, 3. expansion of existing programs and 4. new programs. This is taken together with sources of funding, so a project that otherwise may not have a high a priority, has funding that cannot be used elsewhere is funded. This is true for transportation projects that variously have, Gas Tax, Measure Q or J, traffic mitigation fee revenue or developer mitigation fees. The most flexible funding is saved to be committed last and restricted funds are programmed first. The flexible funds are used to fill in at the end in their applicable category.

In that context, projects have a scope of work developed and a preliminary plan, sometimes only schematic, is developed. For street projects the scope is based on the need and purpose of the project. If the project is a complete streets project, or a street beautification project, green infrastructure will be considered for incorporation considering a number of factors. First is the need being addressed, the second is whether there is eligible funding for the scope of work. The third is the available right of way for the project. Many projects in the developed commercial area are constrained to pavement rehabilitation.

## 8 Adaptive Management

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### 8.1 Process for Plan Updates

The process to update the plan will be to review what has happened and what has changed as the Town moves into the budgeting period. This will be the time to:

- Update the new development commitments that are subject to C.3
- Make any necessary changes to the “UrbanSim” model to reflect more current future projections
- Add any completed public projects
- Update the CIP list for newly developed desired projects

### 8.2 Pursuing Future Funding Sources

Pursuing future funding resources will have challenges. As the BASMAA “Roadmap” reports:

“Because each funding programs has historically focused on only one or a few of the multiple benefits provided by Sustainable Streets, local agencies have encountered challenges in funding Sustainable Streets projects including:

- **Ineligible components of Sustainable Streets projects:** Green infrastructure may be ineligible for funding by transportation grants; transportation facilities may be ineligible for funding by resource agency grants.
- **Ineligible activities:** Some grants may not cover all project phases, such as planning or short-term maintenance.
- **Inability to use other grants as matching funds:** Matching funds must cover eligible activities; therefore, grant funding for GI components of a Sustainable Street project may not “count” as a match for a transportation grant, and vice versa.
- **Funding cycles of grants are not coordinated:** Projects that must assemble funding from multiple grants may have difficulty finding two applicable grants that will be available at the same time.
- **Costs of tracking and applying for grants:** Local agencies often lack the resources to track grant opportunities, prepare applications, and “repackage” the same project to apply for multiple grants.
- **Costs of administering and reporting on grants:** Obtaining multiple grants for a single project adds substantial administrative requirements due to separate record-keeping and reporting.
- **Scoring approaches may penalize multiple-benefit projects:** Sustainable Streets projects may not score competitively for grants that seek the most cost-effective transportation solution, due to the inclusion of ineligible costs.”

With guidance of the Roadmap, a Roadmap Committee will follow three pathways; Pathway 1 – Prioritize Sustainable Street in Funding Resources, Pathway 2 – Improve Conditions for Projects that Are Funded by Multiple Grants, and Pathway 3 – Pursue Additional Funding Options.

Pathway 1 is to “... maximize the ability of each funding source to fund both transportation and green stormwater infrastructure improvements -- reflecting the integration of transportation and resource benefits in Sustainable Streets .... A number of the actions are specific to the State Water Resources Control Board’s Storm Water Grant



Program (SWGPP) and the Metropolitan Transportation Commission's One Bay Area Grant Program (OBAG)," The Pathway also looks to "... recommend requirements for interagency collaboration and or participation by key agencies in actions that promote widespread implementation of sustainable streets, recognizing that requirements have been needed for interagency collaboration ..."

Pathway 2 seeks to improve conditions for projects with multiple funding sources. The goal is to remove obstacles that agencies have encountered to obtain multiple grants for a single sustainable streets project.

Pathway 3 is intended to find ways to "... improve conditions for local agencies to fund Sustainable Streets projects with a range of funding options, including fees and loans, and the funding of pavement rehabilitation projects, through sources identified in Senate Bill 1 (SB 1), the Road Repair and Accountability Act of 2017, which was signed into law on April 28, 2017."

### **8.3 Alternative Compliance and Credit Trading Investigations**

Alternative compliance will need to be carefully reviewed for both the opportunity to achieve compliance but also to be aware of funding use restraints when working collaboratively. Determining whether the Permittees would collectively pursue Alternative Compliance will be a lengthy process requiring a comprehensive dialogue in the public forum lead by the elected officials. Further, commitment to the implementation of any alternative compliance scenarios would necessarily require overall agreement and is beyond the scope of this plan.

Nonetheless, the Geosyntec Consultants August 7, 2019 memo to the CCCWP entitled "Reasonable Assurance Analysis Countywide Attainment Strategy" details preliminary findings, a countywide attainment scenario and strategy. The memo is attached as Appendix B.

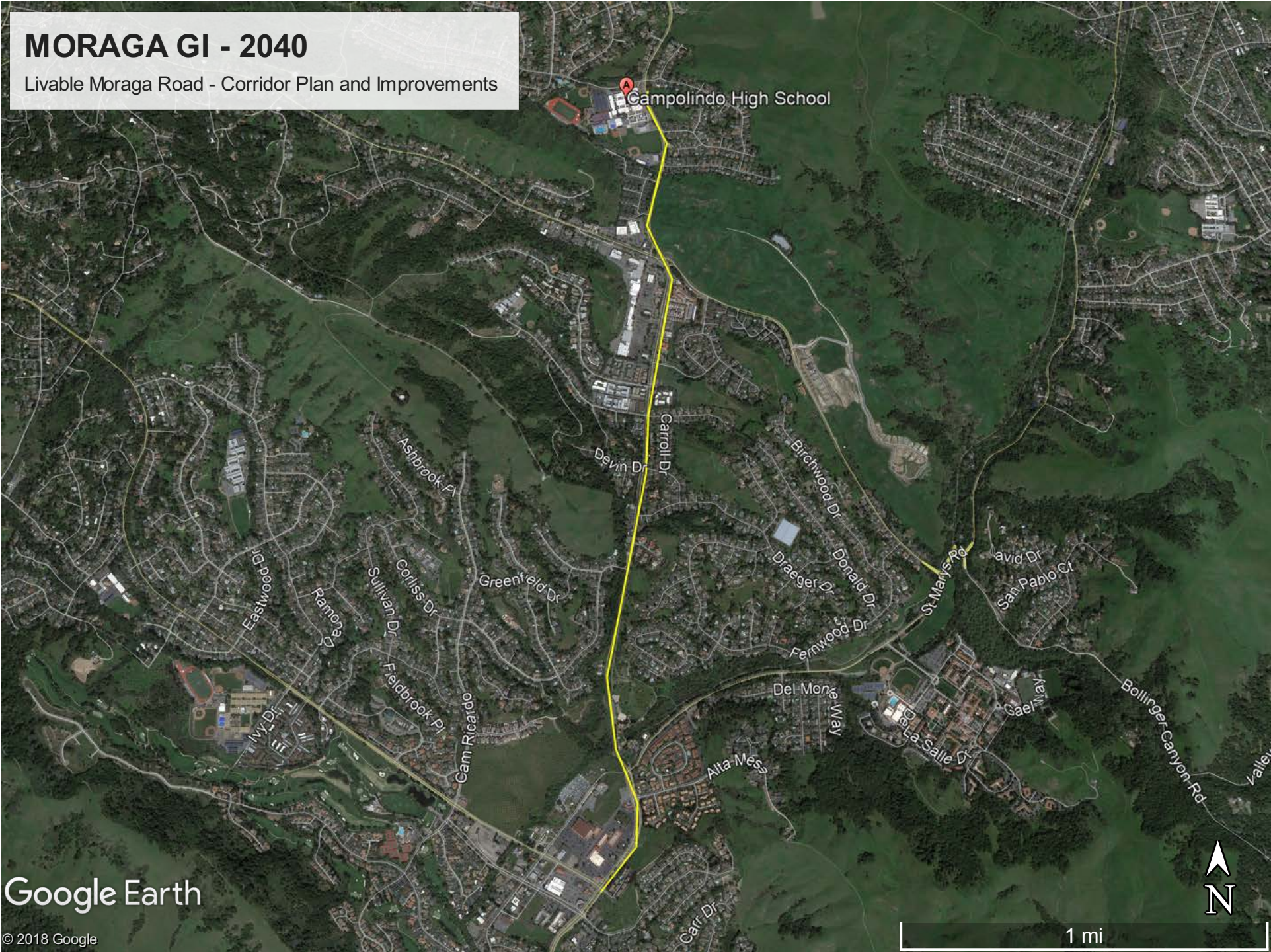
**APPENDIX A**  
**PUBLIC PROJECT MAPS**



# MORAGA GI - 2040

Livable Moraga Road - Corridor Plan and Improvements

Campolindo High School



Google Earth

© 2018 Google



1 mi



# MORAGA GI - 2030

St Mary's Road / Rheem Boulevard / Bollinger Canyon Road Roundabouts



Google Earth

© 2018 Google



300 ft



# MORAGA GI - 2020

Moraga Way and Canyon/Camino Pablo Improvements



Google Earth

© 2018 Google

Constance Pl

Canyon Rd

Camino Pablo

200 ft



## **APPENDIX B**

# **REASONABLE ASSURANCE ANALYSIS COUNTYWIDE ATTAINMENT STRATEGY**

## Memorandum

Date: August 7, 2019  
To: Courtney Riddle, Karin Graves, and Lucile Paquette, Contra Costa Clean Water Program  
Copy: Dan Cloak, Dan Cloak Environmental Consulting  
From: Lisa Austin, Principal; Kelly Havens, Senior Engineer; and Austin Orr, Professional Engineer  
Subject: Reasonable Assurance Analysis Countywide Attainment Strategy  
Geosyntec Project Number: LA0540

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### 1. BACKGROUND

#### 1.1 Regulatory Requirements

Provisions C.11/12.c.ii.(2) of the Municipal Regional Permit (MRP) require Permittees to prepare Reasonable Assurance Analyses (RAA) for mercury and PCBs, respectively, that achieve the following objectives:

- a) Quantify the relationship between areal extent of green infrastructure (GI) implementation and load reductions, taking into consideration the scale of contamination of the treated area as well as the pollutant removal effectiveness of likely GI strategies;
- b) Estimate the amount and characteristics of land area that will be treated through GI by 2020, 2030, and 2040;
- c) Estimate the amount of load reductions that will result from GI implementation by 2020, 2030, and 2040; and
- d) Quantitatively demonstrate that PCBs reductions of at least 0.5 kg/yr and mercury reductions of 1.7 kg/yr will be realized within Contra Costa County by 2040 through implementation of GI projects.

#### 1.2 Preliminary RAA Findings

Geosyntec Consultants (Geosyntec) is conducting RAA modeling for the Contra Costa Clean Water Program (CCCWP) as required by the MRP for submittal with the 2020 Annual Report. In

Fiscal Year 2018/19, Geosyntec conducted RAA modeling to assist the Permittees with GI planning<sup>1</sup>.

As part of the preliminary RAA modeling conducted to assist Permittees with GI Planning, a “Countywide Attainment Scenario” was modeled which examined PCBs loads reduced by each project opportunity incorporated in the Contra Costa Watersheds Storm Water Resource Plan (CCW SWRP). This scenario focused on PCBs, consistent with the MRP’s emphasis on measures designed to reduce PCBs, while also evaluating opportunities for mercury reduction. CCCWP has drafted this Countywide Attainment Scenario memorandum to summarize these results and further the Permittees’ group discussion of how PCBs load reduction goals could be achieved on a countywide basis.

The results of this analysis demonstrate that the public GI retrofit opportunities that have the highest potential to reduce PCBs loads are concentrated within a small subset of Contra Costa Permittee area due to the pattern of pre-1980 industrial development within the region. (Note that GI implementation feasibility was not field-evaluated as part of development of the CCW SWRP, thus the feasibility of implementation for these potential project locations has yet to receive a site-specific evaluation.) Conversely, many Contra Costa Permittees have no or very few opportunities to contribute significantly toward achievement of countywide PCBs loading reductions via implementation of GI in their communities. Further, if load reductions are not achieved on a regional or countywide scale, and load reductions are allocated at a local level (by population), these Permittees would not be able to achieve those load reduction allocations due to a lack of opportunity.

Thus, given these findings, the Contra Costa Permittees, collectively, believe that a countywide strategy would be the best way to achieve the PCBs load reduction goals in a more efficient and effective manner. For the purposes of creating their local GI Plans, Contra Costa Permittees have prioritized their GI projects based on achieving other multiple benefits. These other benefits include controlling other stormwater pollutants, preserving and enhancing local stream hydrology, reducing localized flooding, helping communities adapt to climate change by increasing the resiliency of water supply, ancillary benefits that derive from adding landscaped areas within the urbanized environment, and mitigating the urban heat island effect.

This Countywide Attainment Strategy memorandum is referenced in the Permittees’ GI Plans for information only, and it does not represent, in any way, an intent to implement the strategy or any

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<sup>1</sup> The results of this RAA modeling are preliminary. The CCCWP is in the process, in collaboration with BASMAA, of having the RAA modeling approach peer-reviewed. The RAA modeling results are subject to revision depending on the outcome of the peer review process.



of the projects listed herein. For projects for which potential implementation will be pursued, refer to each Permittee's individual GI Plan project list and prioritization.

This memorandum describes the approach used to model the Countywide Attainment scenario and presents the results of the analysis, in addition to potential next steps for Contra Costa County Permittees to implement projects collectively in an effort to meet the load reduction requirements included in the MRP.

## 2. COUNTYWIDE ATTAINMENT SCENARIO METHODOLOGY

### 2.1 Methodology Overview

To conduct the RAA Countywide Attainment Scenario modeling, calculations were performed, and inputs procured or developed, as follows:

1. Baseline modeling was conducted to estimate the baseline (i.e., 2003) load of PCBs and mercury for Contra Costa County.
2. Using the resulting baseline load, calculations were performed to establish the MRP-required load reduction through GI for 2040.
3. GIS inputs were obtained or finalized for existing redevelopment and public GI projects and future private (i.e., C.3.d) projects, as follows:
  - a. New development and redevelopment projects from 2003 – 2018 were compiled from existing AGOL<sup>2</sup> project data, and
  - b. UrbanSim<sup>3</sup> redevelopment projections for 2020, 2030, and 2040 were confirmed or revised by the Permittees.
4. The GI load reduction model was applied to the existing development (through 2018) and predicted future private redevelopment (2019 – 2040) to assess the PCBs loads reduced by these projects.

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<sup>2</sup> The CCCWP's stormwater GIS platform, created using ESRI's ArcGIS Online (AGOL) for Organizations environment. The *C.3 Project Tracking and Load Reduction Accounting Tool* is used for tracking GI projects implemented under C.3 within the CCCWP AGOL system.

<sup>3</sup> A model developed by the Urban Analytics Lab at the University of California under contract to the Bay Area MTC. The Bay Area's application of UrbanSim was developed specifically to support the development of Plan Bay Area, the Bay Area's Sustainable Communities planning effort. MTC forecasts growth in households and jobs and uses the UrbanSim model to identify development and redevelopment sites to satisfy future demand. This model was applied to Contra Costa County to project new and redevelopment for the RAA model timeframes.

5. A countywide PCBs public retrofit load reduction goal was then calculated by subtracting the load reduced by the existing and projected future private redevelopment load from the countywide goal established in Step 2.
6. The GI load reduction model was applied to the CCW SWRP project opportunities list to assess PCBs loads reduced by each project opportunity.

Additional detail is provided in the following sections.

## 2.2 Baseline Modeling

The countywide baseline model was developed as described in the *Quantitative Relationship Between GI Implementation and PCBs/Mercury Load Reductions* report (CCCWP, 2018).

A GIS analysis was conducted to apportion the modeled baseline load to areas above and below dams, within the San Francisco Bay Regional Water Quality Control Board (Region 2) versus Central Valley Regional Water Quality Control Board (Region 5), and other NPDES permittee area (i.e., parcels associated with individual NPDES permits, Industrial General Permit facilities, and Phase 2 permittee areas). The TMDLs were calculated for all urban areas draining to San Francisco Bay (thus only Region 2) and for areas below dams (as it is assumed that the dams capture sediments and prevent them from carrying pollutants to the Bay). Additionally, the parcel area associated with other NPDES permits was removed to estimate the baseline load attributable to the MS4 permit area only. Thus, the baseline countywide PCBs load below dams, within Region 2, was used to establish the PCBs load reduction goal for the MS4 permit area.

The results of the baseline modeling are presented in Table 1 below. The baseline countywide load used to establish the PCBs load reduction goal for the Permittee area is shown in bold.

**Table 1: RAA Baseline PCBs Load Allocation Table (grams)**

RWQCB Region	Above/Below Dam	Permit	Baseline Load PCBs (grams)
Region 2	Below Dam	<b>MRP</b>	<b>1,587.0</b>
		NPDES	779.6
		Phase 2	13.7
	Above Dam	MRP	41.4
		NPDES	0.1
		Phase 2	0
Region 5	Below Dam	MRP	134.8
		NPDES	14.8
		Phase 2	0.6
	Above Dam	MRP	1.0
		NPDES	0
		Phase 2	0
		Total	2,572.9

### 2.3 Load Reduction Goal Calculations

Calculations were conducted to develop the load reduction goals for 2020, 2030, and 2040, as described in the *Bay Area RAA Guidance Document* (BASMAA, 2017). The calculation methodology is summarized below.

#### TMDL Attainment Load Reduction (2030)

$$LR_{\text{goal}} = \text{Baseline} - \text{WLA (kg/yr)}$$

Where:

$$LR_{\text{goal}} = \text{The load reduction goal (kg/yr)}$$

$$\text{Baseline} = \text{The baseline pollutant loading as calculated through the RAA}$$

$$\text{WLA} = \text{The population-based wasteload allocation}$$

The TMDL population-based wasteload allocations for Contra Costa County is provided Table 2.

**Table 2: TMDL Population-Based Wasteload Allocations for Contra Costa County**

Stormwater Improvement Goal	Mercury (kg/yr)	PCBs (kg/yr)
Contra Costa County	11	0.3

Per the equation above, the revised load reduction goal for Contra Costa County is 1.287 kg/yr.

#### MRP Load Reduction through GI by 2040

The PCBs load reduction required to be achieved through GI by 2040 (i.e., 3 kg/yr MRP area-wide or 0.5 kg/yr for Contra Costa County) should be adjusted to reflect the RAA-calculated baseline load (i.e., 1.581 kg/yr). The MRP load reduction requirement for GI for all permittees (3 kg/yr) represents 20.8% of the overall required TMDL load reduction. Therefore, the adjusted countywide load reduction through GI can be calculated as:

$$LR_{\text{MRP, GI, 2040}} = LR_{\text{goal}} * 20.8\%$$

The adjusted countywide PCBs load reduction goal through GI by 2040 was calculated to be 0.268 kg/yr.

### 2.4 Finalize GIS Inputs for Existing and Future Redevelopment

New development and redevelopment projects completed between 2003 – 2018 were compiled from the existing AGOL project data entered by the Permittees into their respective AGOL C.3 Tracking Tool databases.

UrbanSim redevelopment projections for 2020, 2030, and 2040, as confirmed or revised by the Permittees, were used to model future C.3 projects. The UrbanSim projections for 2020 only included parcels that were predicted to be redeveloped from 2019 – 2020.

## 2.5 Develop Countywide Attainment Scenario

The 2040 PCBs load reduction goal for the Countywide Attainment scenario is calculated as the countywide load reduction goal (0.268 kg/yr) minus the load reduced by the current, projected private, and planned CIP/public retrofit GI projects through 2040. Table 3 indicates the remaining load reduction target for 2040 is approximately 56 grams per year.

**Table 3: Load Reduction Goal for Contra Costa Countywide Attainment Scenario**

PCBs 2040 Load Reduction Goal (kg/yr)	PCBs Load Reduction Achieved by Public and Private GI 2003 -2020 (kg/yr)	Projected PCBs Load Reduction Achieved by Public and Private GI 2003 - 2030 (kg/yr)	Projected PCBs Load Reduction Achieved by Public and Private GI 2003 - 2040 (kg/yr)	Load Reduction Target for Public GI by 2040 PCBs (kg/yr)
0.268	0.120	0.158	0.235	0.033

The baseline model produces a PCBs and mercury “load production” GIS layer that estimates the load corresponding with each parcel and ROW segment within the county (note that individual parcel loadings are representative of the ‘average tendency’ of loading for similar parcels). This “load production” layer was combined in GIS with the public retrofit project opportunities (parcels, regional project drainage areas, and ROW segments) listed in the CCW SWRP to estimate the potential load reduced by each project opportunity, assuming standard bioretention treatment.

## 3. COUNTYWIDE ATTAINMENT SCENARIO RESULTS

The modeled load reduction associated with each project opportunity from the CCW SWRP that is not included as a planned GI project in a Permittee’s GI Plan are listed in the table included in Attachment 1. This table only includes those projects achieving at least 0.01 grams of PCBs load reduction per year, based on the model output. For each project opportunity, the total area and impervious area treated<sup>4</sup>, baseline PCBs yield, and PCBs loads reduced are presented.

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<sup>4</sup> The SWRP did not include delineation of actual off-site tributary drainage areas for the regional project opportunities. Therefore, the pollutant load reduction for these projects was calculated for this Countywide Attainment scenario using the project opportunity parcel area only and the estimated load reduction is less than it would be for the full tributary area.

To achieve the load reduction goal through additional public GI projects by 2040 of 33 grams per year would require treating, at a minimum, 189 acres of the highest-PCBs-yield project area in 90 projects across the county (pending feasibility evaluations, and requiring implementation primarily focused in a few Permittee jurisdictions) and would require much more area and projects using less-load-reducing projects.

#### **4. COUNTYWIDE ATTAINMENT STRATEGY**

To allow for the most efficient implementation of GI to achieve the MRP-stipulated load reduction goal, some Contra Costa Permittees have been actively investigating ways that communities without opportunities to reduce PCBs via GI might potentially fund GI projects in communities that do have such opportunities. This has included consideration of funding streams derived from new developments (for example, in-lieu fees charged when only a portion of on-site C.3 compliance is achieved). However, the legal and administrative requirements are complex, would require considerable effort to resolve, and may not ultimately be resolvable.

The Permittees will continue to consider how to balance the goals of efficient PCBs load reduction via GI (which has been demonstrated to be highly location-specific, and not obtainable by all Permittees) versus the other benefits of GI. This consideration will include participation, with Water Board staff, in ongoing discussions of GI and PCBs load reduction requirements that may be included in MRP 3.0. The Permittees, collectively, will also consider the outcomes of these discussions when preparing the “reasonable assurance analysis to demonstrate quantitatively that PCBs reductions of 3 kg/year will be realized by 2040 through implementation of green infrastructure projects,” which is due in September 2020 as specified in Provision C.12.iii.(3).

Because resources are limited, there will ultimately be trade-offs between the goals of PCBs load reduction via GI versus the other benefits of GI. In the majority of Contra Costa communities, which have few or no locations where PCB loads could be efficiently reduced via GI, the pursuit of a potential Countywide Attainment Strategy would require trade-offs, including minimizing the opportunities to build community engagement and local support for GI. A similar trade-off exists within the communities that do have locations where PCBs loads could be efficiently reduced via GI, as the highest-ranked load-reduction locations rarely coincide with locations where other benefits to the community would be maximized.

#### **5. REFERENCES**

Bay Area Stormwater Management Agencies Association (BASMAA), 2017. Bay Area Reasonable Assurance Analysis Guidance Document. Prepared by Geosyntec Consultants and Paradigm Environmental for BASMAA. June 30, 2017.

Contra Costa Clean Water Program (CCCWP), 2018. Quantitative Relationship Between Green Infrastructure Implementation and PCBs/Mercury Load Reductions. Prepared by Geosyntec Consultants for the CCCWP. August 22, 2018.

\* \* \* \* \*

# Attachment 1

## Countywide Attainment Scenario Load Reduction Results Table

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Clayton	2	ROW 4341	ROW Opportunity	26.22	12.29	47%	0.001	0.072
Clayton	2	Parcel 283666	Parcel-Based Opportunity	6.77	2.04	30%	0.002	0.034
Clayton	2	ROW 3872	ROW Opportunity	2.82	1.25	44%	0.003	0.026
Clayton	2	ROW 11618	ROW Opportunity	1.61	0.77	48%	0.004	0.022
Clayton	2	ROW 5783	ROW Opportunity	1.29	0.56	43%	0.005	0.021
Clayton	2	ROW 12947	ROW Opportunity	1.05	0.43	41%	0.004	0.017
Clayton	2	ROW 11934	ROW Opportunity	10.54	5.01	48%	0.001	0.015
Clayton	2	ROW 13056	ROW Opportunity	8.81	3.84	44%	0.001	0.014
Clayton	2	ROW 13758	ROW Opportunity	5.93	1.49	25%	0.001	0.012
Clayton	2	ROW 13231	ROW Opportunity	0.44	0.23	52%	0.006	0.010
Clayton	2	ROW 19397	ROW Opportunity	5.73	2.58	45%	0.001	0.010
Clayton	2	Parcel 283215	Parcel-Based Opportunity	7.37	3.04	41%	0.001	0.010
Concord	2	Parcel 376303	Parcel-Based Opportunity	494.22	25.30	5%	0.004	8.822
Concord	2	Parcel 376306	Parcel-Based Opportunity	208.83	10.65	5%	0.004	3.719
Concord	2	Parcel 177920	Parcel-Based Opportunity	18.60	14.13	76%	0.041	3.276
Concord	2	Parcel 324333	Parcel-Based Opportunity	163.95	8.57	5%	0.003	1.752
Concord	2	ROW 16900	ROW Opportunity	20.40	9.18	45%	0.016	1.300
Concord	2	ROW 21618	ROW Opportunity	37.07	24.40	66%	0.008	1.039
Concord	2	Parcel 184135	Parcel-Based Opportunity	5.35	3.96	74%	0.041	0.920
Concord	2	ROW 21616	ROW Opportunity	27.30	18.24	67%	0.008	0.799
Concord	2	ROW 1201	ROW Opportunity	20.61	13.29	64%	0.010	0.755
Concord	2	Parcel 244879	Parcel-Based Opportunity	66.94	3.41	5%	0.003	0.722
Concord	2	Parcel 192657	Parcel-Based Opportunity	5.89	3.00	51%	0.029	0.722
Concord	2	ROW 5707	ROW Opportunity	18.71	11.09	59%	0.009	0.650
Concord	2	ROW 17557	ROW Opportunity	5.80	3.71	64%	0.023	0.558
Concord	2	ROW 1712	ROW Opportunity	12.97	8.30	64%	0.010	0.500
Concord	2	ROW 7508	ROW Opportunity	5.32	3.73	70%	0.021	0.454
Concord	2	ROW 4583	ROW Opportunity	4.46	3.26	73%	0.024	0.437
Concord	2	ROW 20084	ROW Opportunity	2.97	2.10	71%	0.027	0.331
Concord	2	ROW 5817	ROW Opportunity	3.19	2.16	68%	0.023	0.295
Concord	2	Parcel 338478	Parcel-Based Opportunity	38.88	1.98	5%	0.002	0.292
Concord	2	ROW 19024	ROW Opportunity	2.48	1.34	54%	0.028	0.291
Concord	2	Parcel 191035	Regional Opportunity	2.32	1.16	50%	0.028	0.278
Concord	2	ROW 8864	ROW Opportunity	1.38	0.97	70%	0.037	0.214
Concord	2	ROW 5806	ROW Opportunity	7.28	4.91	67%	0.008	0.213
Concord	2	ROW 15327	ROW Opportunity	31.55	17.19	54%	0.002	0.211
Concord	2	ROW 4439	ROW Opportunity	1.89	1.36	72%	0.026	0.205
Concord	2	ROW 7624	ROW Opportunity	6.85	4.66	68%	0.008	0.204
Concord	2	ROW 9455	ROW Opportunity	4.16	2.79	67%	0.012	0.190
Concord	2	ROW 3954	ROW Opportunity	1.94	1.42	73%	0.024	0.185
Concord	2	ROW 21113	ROW Opportunity	48.14	24.36	51%	0.002	0.182
Concord	2	Parcel 186608	Regional Opportunity	1.06	0.73	69%	0.038	0.171
Concord	2	ROW 8938	ROW Opportunity	1.26	1.03	82%	0.032	0.169
Concord	2	Parcel 229694	Parcel-Based Opportunity	6.43	3.65	57%	0.007	0.166
Concord	2	Parcel 235175	Parcel-Based Opportunity	6.15	3.59	58%	0.007	0.160
Concord	2	ROW 2934	ROW Opportunity	5.33	3.63	68%	0.008	0.159
Concord	2	ROW 12379	ROW Opportunity	5.60	3.63	65%	0.008	0.157
Concord	2	ROW 7623	ROW Opportunity	1.90	1.39	73%	0.020	0.155
Concord	2	Parcel 205735	Parcel-Based Opportunity	4.42	3.53	80%	0.010	0.154
Concord	2	Parcel 198247	Parcel-Based Opportunity	5.13	3.94	77%	0.009	0.153
Concord	2	ROW 4349	ROW Opportunity	1.39	1.03	74%	0.025	0.141
Concord	2	ROW 11894	ROW Opportunity	16.04	9.24	58%	0.003	0.139
Concord	2	ROW 10734	ROW Opportunity	2.73	1.85	68%	0.013	0.136
Concord	2	ROW 19586	ROW Opportunity	32.40	16.40	51%	0.002	0.136
Concord	2	ROW 11140	ROW Opportunity	0.69	0.57	83%	0.045	0.132
Concord	2	ROW 4621	ROW Opportunity	21.49	10.65	50%	0.002	0.130
Concord	2	Parcel 240615	Parcel-Based Opportunity	14.13	8.79	62%	0.003	0.122
Concord	2	Parcel 242414	Parcel-Based Opportunity	4.67	2.72	58%	0.007	0.121
Concord	2	ROW 16782	ROW Opportunity	10.40	5.35	51%	0.004	0.119
Concord	2	ROW 10221	ROW Opportunity	14.29	7.61	53%	0.003	0.118
Concord	2	ROW 14417	ROW Opportunity	7.27	4.56	63%	0.005	0.113
Concord	2	ROW 20964	ROW Opportunity	9.96	4.91	49%	0.004	0.112
Concord	2	ROW 17558	ROW Opportunity	0.91	0.61	67%	0.029	0.109
Concord	2	ROW 14842	ROW Opportunity	15.90	7.68	48%	0.002	0.108
Concord	2	Parcel 232269	Parcel-Based Opportunity	3.76	2.45	65%	0.008	0.108
Concord	2	ROW 4342	ROW Opportunity	43.01	22.81	53%	0.001	0.106
Concord	2	ROW 545	ROW Opportunity	12.27	5.54	45%	0.003	0.106
Concord	2	ROW 1200	ROW Opportunity	9.75	5.67	58%	0.004	0.105
Concord	2	ROW 21494	ROW Opportunity	29.51	15.04	51%	0.001	0.101
Concord	2	Parcel 203140	Parcel-Based Opportunity	3.46	2.29	66%	0.008	0.100
Concord	2	ROW 18045	ROW Opportunity	13.09	7.24	55%	0.003	0.099
Concord	2	ROW 14001	ROW Opportunity	12.47	6.86	55%	0.003	0.094
Concord	2	ROW 8159	ROW Opportunity	9.23	5.02	54%	0.003	0.094
Concord	2	ROW 12852	ROW Opportunity	22.99	12.35	54%	0.002	0.092
Concord	2	ROW 12856	ROW Opportunity	2.03	1.22	60%	0.011	0.088
Concord	2	ROW 4608	ROW Opportunity	4.23	2.67	63%	0.006	0.084
Concord	2	ROW 7622	ROW Opportunity	1.50	1.10	73%	0.015	0.084
Concord	2	ROW 1470	ROW Opportunity	1.70	1.14	67%	0.013	0.081
Concord	2	ROW 4619	ROW Opportunity	13.13	6.40	49%	0.002	0.076
Concord	2	ROW 8157	ROW Opportunity	13.11	7.08	54%	0.002	0.076
Concord	2	Parcel 247239	Regional Opportunity	2.44	1.71	70%	0.009	0.076
Concord	2	ROW 6819	ROW Opportunity	1.92	1.26	66%	0.011	0.075
Concord	2	Parcel 144216	Parcel-Based Opportunity	40.90	18.50	45%	0.001	0.074
Concord	2	ROW 4618	ROW Opportunity	18.26	9.24	51%	0.002	0.073
Concord	2	Parcel 231090	Parcel-Based Opportunity	3.71	1.58	43%	0.006	0.073
Concord	2	Parcel 206355	Regional Opportunity	2.18	1.80	83%	0.010	0.073
Concord	2	ROW 1577	ROW Opportunity	2.98	1.51	51%	0.007	0.071
Concord	2	ROW 13705	ROW Opportunity	11.05	5.52	50%	0.002	0.071
Concord	2	ROW 4609	ROW Opportunity	1.62	1.09	67%	0.011	0.067
Concord	2	Parcel 192425	Parcel-Based Opportunity	0.48	0.28	58%	0.033	0.067
Concord	2	ROW 1474	ROW Opportunity	7.02	3.51	50%	0.003	0.066
Concord	2	Parcel 291299	Parcel-Based Opportunity	40.01	16.11	40%	0.001	0.066
Concord	2	ROW 20692	ROW Opportunity	4.78	2.17	45%	0.004	0.064
Concord	2	ROW 5673	ROW Opportunity	11.65	5.87	50%	0.002	0.063



Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Concord	2	ROW 4514	ROW Opportunity	4.22	2.32	55%	0.005	0.062
Concord	2	ROW 15146	ROW Opportunity	4.67	2.45	52%	0.004	0.059
Concord	2	ROW 12217	ROW Opportunity	9.08	4.78	53%	0.002	0.058
Concord	2	ROW 21132	ROW Opportunity	2.04	1.36	67%	0.008	0.058
Concord	2	ROW 11820	ROW Opportunity	2.06	1.02	50%	0.008	0.057
Concord	2	Parcel 214703	Parcel-Based Opportunity	3.81	1.22	32%	0.004	0.057
Concord	2	ROW 6785	ROW Opportunity	2.52	1.66	66%	0.007	0.056
Concord	2	Parcel 190759	Regional Opportunity	1.26	1.11	88%	0.012	0.055
Concord	2	Parcel 376302	Parcel-Based Opportunity	42.06	12.85	31%	0.001	0.054
Concord	2	Parcel 251412	Parcel-Based Opportunity	3.12	1.06	34%	0.005	0.054
Concord	2	ROW 4137	ROW Opportunity	7.10	3.61	51%	0.003	0.053
Concord	2	ROW 13078	ROW Opportunity	4.96	2.60	52%	0.003	0.052
Concord	2	ROW 9759	ROW Opportunity	1.82	1.20	66%	0.008	0.051
Concord	2	ROW 13704	ROW Opportunity	9.77	5.13	53%	0.002	0.050
Concord	2	ROW 5392	ROW Opportunity	0.92	0.65	71%	0.014	0.050
Concord	2	ROW 4966	ROW Opportunity	6.49	2.88	44%	0.003	0.049
Concord	2	ROW 20635	ROW Opportunity	5.04	2.60	52%	0.003	0.048
Concord	2	planned 203	Planned Creek/Marsh Restoration	131.53	18.22	14%	0.000	0.048
Concord	2	Parcel 290823	Regional Opportunity	1.29	1.10	85%	0.010	0.048
Concord	2	ROW 7731	ROW Opportunity	2.11	1.48	70%	0.007	0.047
Concord	2	Parcel 214282	Parcel-Based Opportunity	30.73	11.51	37%	0.001	0.047
Concord	2	ROW 1445	ROW Opportunity	15.65	7.47	48%	0.001	0.044
Concord	2	ROW 6856	ROW Opportunity	15.51	7.43	48%	0.001	0.044
Concord	2	Parcel 233711	Regional Opportunity	1.41	1.00	71%	0.009	0.044
Concord	2	ROW 12679	ROW Opportunity	7.36	3.68	50%	0.002	0.043
Concord	2	ROW 4968	ROW Opportunity	15.10	7.32	48%	0.001	0.043
Concord	2	ROW 13077	ROW Opportunity	6.74	3.68	55%	0.002	0.042
Concord	2	ROW 14213	ROW Opportunity	3.96	2.09	53%	0.004	0.042
Concord	2	ROW 2389	ROW Opportunity	7.58	3.81	50%	0.002	0.041
Concord	2	ROW 9299	ROW Opportunity	2.01	1.31	65%	0.006	0.040
Concord	2	ROW 19589	ROW Opportunity	1.50	0.88	59%	0.007	0.039
Concord	2	ROW 20799	ROW Opportunity	9.69	4.87	50%	0.002	0.039
Concord	2	ROW 8514	ROW Opportunity	2.14	1.69	79%	0.006	0.039
Concord	2	ROW 8633	ROW Opportunity	2.16	1.19	55%	0.005	0.038
Concord	2	ROW 1496	ROW Opportunity	9.68	4.76	49%	0.002	0.037
Concord	2	Parcel 206674	Regional Opportunity	1.53	0.90	59%	0.007	0.037
Concord	2	ROW 11474	ROW Opportunity	13.96	6.70	48%	0.001	0.036
Concord	2	ROW 2707	ROW Opportunity	3.07	1.72	56%	0.004	0.036
Concord	2	ROW 19429	ROW Opportunity	2.86	1.57	55%	0.004	0.035
Concord	2	ROW 7830	ROW Opportunity	5.91	2.96	50%	0.002	0.035
Concord	2	ROW 8405	ROW Opportunity	0.88	0.57	65%	0.011	0.035
Concord	2	ROW 15145	ROW Opportunity	3.60	1.90	53%	0.003	0.034
Concord	2	ROW 14485	ROW Opportunity	3.31	1.63	49%	0.003	0.034
Concord	2	ROW 8996	ROW Opportunity	1.59	0.86	54%	0.006	0.033
Concord	2	ROW 10594	ROW Opportunity	12.05	5.90	49%	0.001	0.032
Concord	2	ROW 14712	ROW Opportunity	2.42	1.43	59%	0.004	0.032
Concord	2	ROW 19358	ROW Opportunity	10.05	5.04	50%	0.001	0.032
Concord	2	ROW 19557	ROW Opportunity	0.29	0.17	59%	0.026	0.032
Concord	2	ROW 3955	ROW Opportunity	3.56	1.78	50%	0.003	0.032
Concord	2	Parcel 143398	Parcel-Based Opportunity	17.79	8.05	45%	0.001	0.032
Concord	2	ROW 12567	ROW Opportunity	14.87	7.28	49%	0.001	0.030
Concord	2	ROW 13167	ROW Opportunity	11.13	5.31	48%	0.001	0.030
Concord	2	ROW 18933	ROW Opportunity	1.85	1.04	56%	0.005	0.030
Concord	2	ROW 7347	ROW Opportunity	1.22	0.93	76%	0.007	0.030
Concord	2	planned 422	Planned Unlined Bioretention	2.14	1.20	56%	0.004	0.030
Concord	2	ROW 12422	ROW Opportunity	2.70	1.38	51%	0.004	0.029
Concord	2	ROW 9241	ROW Opportunity	1.67	0.80	48%	0.005	0.029
Concord	2	Parcel 189589	Regional Opportunity	1.31	0.64	49%	0.006	0.029
Concord	2	ROW 13981	ROW Opportunity	3.75	1.83	49%	0.002	0.028
Concord	2	ROW 330	ROW Opportunity	7.40	3.68	50%	0.002	0.028
Concord	2	ROW 4033	ROW Opportunity	3.71	1.78	48%	0.003	0.028
Concord	2	Parcel 215855	Regional Opportunity	1.37	0.61	45%	0.006	0.028
Concord	2	ROW 14000	ROW Opportunity	1.10	0.63	57%	0.007	0.027
Concord	2	ROW 9635	ROW Opportunity	3.66	1.68	46%	0.003	0.027
Concord	2	Parcel 231516	Regional Opportunity	1.44	0.59	41%	0.005	0.027
Concord	2	ROW 11942	ROW Opportunity	2.12	1.16	55%	0.004	0.026
Concord	2	ROW 14482	ROW Opportunity	2.43	1.00	41%	0.003	0.026
Concord	2	ROW 15994	ROW Opportunity	7.13	3.36	47%	0.001	0.026
Concord	2	ROW 16608	ROW Opportunity	10.91	5.23	48%	0.001	0.026
Concord	2	ROW 1867	ROW Opportunity	3.65	1.92	53%	0.003	0.026
Concord	2	ROW 2690	ROW Opportunity	4.41	2.49	56%	0.002	0.026
Concord	2	ROW 4136	ROW Opportunity	3.43	1.60	47%	0.003	0.026
Concord	2	ROW 6347	ROW Opportunity	1.81	0.91	50%	0.004	0.026
Concord	2	ROW 1535	ROW Opportunity	3.62	2.07	57%	0.002	0.025
Concord	2	ROW 15747	ROW Opportunity	1.16	0.75	65%	0.006	0.025
Concord	2	ROW 16947	ROW Opportunity	13.34	6.33	47%	0.001	0.025
Concord	2	ROW 663	ROW Opportunity	3.78	1.89	50%	0.002	0.025
Concord	2	Parcel 208247	Regional Opportunity	0.79	0.57	72%	0.009	0.025
Concord	2	ROW 7875	ROW Opportunity	8.98	4.45	50%	0.001	0.024
Concord	2	ROW 18838	ROW Opportunity	1.39	0.79	57%	0.005	0.024
Concord	2	ROW 18934	ROW Opportunity	1.22	0.76	62%	0.006	0.024
Concord	2	ROW 20559	ROW Opportunity	10.08	4.59	46%	0.001	0.024
Concord	2	ROW 20591	ROW Opportunity	5.62	3.00	53%	0.002	0.024
Concord	2	ROW 21160	ROW Opportunity	12.09	5.95	49%	0.001	0.024
Concord	2	ROW 9740	ROW Opportunity	9.01	4.21	47%	0.001	0.024
Concord	2	Parcel 228202	Regional Opportunity	0.75	0.54	72%	0.009	0.024
Concord	2	ROW 12595	ROW Opportunity	1.04	0.64	62%	0.006	0.023
Concord	2	ROW 1269	ROW Opportunity	3.07	1.61	52%	0.003	0.023
Concord	2	ROW 15782	ROW Opportunity	1.11	0.70	63%	0.006	0.023
Concord	2	ROW 19980	ROW Opportunity	1.29	0.65	50%	0.005	0.023
Concord	2	ROW 20290	ROW Opportunity	2.46	1.49	61%	0.003	0.023
Concord	2	ROW 20752	ROW Opportunity	2.19	1.61	74%	0.004	0.023
Concord	2	ROW 7581	ROW Opportunity	1.16	0.71	61%	0.006	0.023
Concord	2	ROW 8121	ROW Opportunity	8.21	3.76	46%	0.001	0.023

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Concord	2	Parcel 214996	Parcel-Based Opportunity	8.68	5.91	68%	0.001	0.023
Concord	2	ROW 1178	ROW Opportunity	4.47	2.20	49%	0.002	0.022
Concord	2	ROW 686	ROW Opportunity	3.00	1.51	50%	0.003	0.022
Concord	2	ROW 7635	ROW Opportunity	2.74	1.32	48%	0.003	0.022
Concord	2	planned_421	Planned Unlined Bioretention	2.87	1.58	55%	0.003	0.022
Concord	2	Parcel 231203	Parcel-Based Opportunity	14.55	5.28	36%	0.001	0.022
Concord	2	Parcel 196927	Regional Opportunity	0.93	0.65	70%	0.007	0.022
Concord	2	Parcel 140573	Parcel-Based Opportunity	9.15	5.56	61%	0.001	0.022
Concord	2	ROW 1480	ROW Opportunity	1.83	1.01	55%	0.004	0.021
Concord	2	ROW 231	ROW Opportunity	1.44	0.80	56%	0.004	0.021
Concord	2	ROW 6904	ROW Opportunity	8.33	3.99	48%	0.001	0.021
Concord	2	Parcel 148570	Parcel-Based Opportunity	10.29	5.19	50%	0.001	0.021
Concord	2	ROW 2388	ROW Opportunity	5.15	2.44	47%	0.002	0.020
Concord	2	ROW 272	ROW Opportunity	3.17	1.68	53%	0.002	0.020
Concord	2	ROW 4353	ROW Opportunity	9.22	4.47	48%	0.001	0.020
Concord	2	ROW 5431	ROW Opportunity	11.51	5.65	49%	0.001	0.020
Concord	2	ROW 6270	ROW Opportunity	10.98	5.38	49%	0.001	0.020
Concord	2	ROW 6428	ROW Opportunity	3.11	1.75	56%	0.002	0.020
Concord	2	ROW 7665	ROW Opportunity	4.31	2.22	52%	0.002	0.020
Concord	2	Parcel 282436	Parcel-Based Opportunity	11.78	4.88	41%	0.001	0.020
Concord	2	Parcel 298561	Parcel-Based Opportunity	38.95	5.79	15%	0.000	0.020
Concord	2	ROW 12020	ROW Opportunity	4.76	2.29	48%	0.002	0.019
Concord	2	ROW 12340	ROW Opportunity	8.43	4.07	48%	0.001	0.019
Concord	2	ROW 12594	ROW Opportunity	0.92	0.55	60%	0.006	0.019
Concord	2	ROW 16428	ROW Opportunity	8.29	3.98	48%	0.001	0.019
Concord	2	ROW 3778	ROW Opportunity	1.34	0.88	66%	0.005	0.019
Concord	2	ROW 472	ROW Opportunity	0.82	0.45	55%	0.007	0.019
Concord	2	Parcel 220285	Parcel-Based Opportunity	9.96	4.72	47%	0.001	0.019
Concord	2	ROW 16285	ROW Opportunity	4.76	2.23	47%	0.002	0.018
Concord	2	ROW 17122	ROW Opportunity	7.41	3.30	45%	0.001	0.018
Concord	2	ROW 4335	ROW Opportunity	9.00	4.52	50%	0.001	0.018
Concord	2	ROW 4354	ROW Opportunity	4.55	2.23	49%	0.002	0.018
Concord	2	ROW 6786	ROW Opportunity	0.62	0.41	66%	0.008	0.018
Concord	2	Parcel 209956	Regional Opportunity	0.66	0.42	64%	0.008	0.018
Concord	2	Parcel 202503	Parcel-Based Opportunity	5.94	4.60	77%	0.001	0.018
Concord	2	Parcel 186686	Regional Opportunity	0.75	0.45	60%	0.007	0.018
Concord	2	ROW 13364	ROW Opportunity	9.62	4.24	44%	0.001	0.017
Concord	2	ROW 13763	ROW Opportunity	1.83	1.14	62%	0.003	0.017
Concord	2	ROW 14442	ROW Opportunity	1.54	0.81	53%	0.004	0.017
Concord	2	ROW 17045	ROW Opportunity	8.58	4.24	49%	0.001	0.017
Concord	2	ROW 18989	ROW Opportunity	1.44	0.71	49%	0.004	0.017
Concord	2	ROW 4337	ROW Opportunity	8.58	4.26	50%	0.001	0.017
Concord	2	ROW 5444	ROW Opportunity	7.67	3.18	41%	0.001	0.017
Concord	2	ROW 5808	ROW Opportunity	1.41	0.85	60%	0.004	0.017
Concord	2	ROW 7088	ROW Opportunity	5.53	2.70	49%	0.001	0.017
Concord	2	ROW 8374	ROW Opportunity	6.24	2.74	44%	0.001	0.017
Concord	2	Parcel 238207	Parcel-Based Opportunity	9.03	4.20	47%	0.001	0.017
Concord	2	Parcel 204041	Parcel-Based Opportunity	0.49	0.42	86%	0.010	0.017
Concord	2	Parcel 288737	Regional Opportunity	0.93	0.40	43%	0.005	0.017
Concord	2	Parcel 166238	Parcel-Based Opportunity	7.81	3.85	49%	0.001	0.017
Concord	2	Parcel 167541	Regional Opportunity	0.73	0.37	51%	0.006	0.017
Concord	2	ROW 18426	ROW Opportunity	5.82	3.22	55%	0.001	0.016
Concord	2	ROW 11295	ROW Opportunity	1.02	0.63	62%	0.005	0.016
Concord	2	ROW 13815	ROW Opportunity	4.98	2.54	51%	0.001	0.016
Concord	2	ROW 14488	ROW Opportunity	2.78	1.40	50%	0.002	0.016
Concord	2	ROW 16235	ROW Opportunity	4.82	2.25	47%	0.001	0.016
Concord	2	ROW 19300	ROW Opportunity	6.58	3.21	49%	0.001	0.016
Concord	2	ROW 3418	ROW Opportunity	8.49	3.91	46%	0.001	0.016
Concord	2	ROW 6349	ROW Opportunity	6.66	3.55	53%	0.001	0.016
Concord	2	Parcel 231117	Parcel-Based Opportunity	9.30	3.93	42%	0.001	0.016
Concord	2	Parcel 209201	Regional Opportunity	0.96	0.36	38%	0.005	0.016
Concord	2	Parcel 189945	Parcel-Based Opportunity	9.41	4.05	43%	0.001	0.016
Concord	2	ROW 10926	ROW Opportunity	8.71	4.01	46%	0.001	0.015
Concord	2	ROW 12001	ROW Opportunity	6.33	4.11	65%	0.001	0.015
Concord	2	ROW 12464	ROW Opportunity	6.99	3.40	49%	0.001	0.015
Concord	2	ROW 14169	ROW Opportunity	7.12	3.63	51%	0.001	0.015
Concord	2	ROW 14214	ROW Opportunity	1.27	0.73	57%	0.004	0.015
Concord	2	ROW 14589	ROW Opportunity	8.26	3.76	46%	0.001	0.015
Concord	2	ROW 15996	ROW Opportunity	1.51	0.82	54%	0.003	0.015
Concord	2	ROW 16812	ROW Opportunity	3.85	1.82	47%	0.002	0.015
Concord	2	ROW 16832	ROW Opportunity	4.69	2.13	45%	0.001	0.015
Concord	2	ROW 19307	ROW Opportunity	5.38	3.83	71%	0.001	0.015
Concord	2	ROW 21441	ROW Opportunity	7.99	3.70	46%	0.001	0.015
Concord	2	ROW 4958	ROW Opportunity	5.71	2.74	48%	0.001	0.015
Concord	2	ROW 5672	ROW Opportunity	2.80	1.35	48%	0.002	0.015
Concord	2	ROW 7089	ROW Opportunity	5.57	2.70	48%	0.001	0.015
Concord	2	ROW 9096	ROW Opportunity	7.26	3.76	52%	0.001	0.015
Concord	2	Parcel 200676	Parcel-Based Opportunity	5.03	3.86	77%	0.001	0.015
Concord	2	Parcel 193540	Parcel-Based Opportunity	7.39	3.59	49%	0.001	0.015
Concord	2	Parcel 228429	Parcel-Based Opportunity	8.15	3.64	45%	0.001	0.015
Concord	2	Parcel 211022	Parcel-Based Opportunity	7.84	3.86	49%	0.001	0.015
Concord	2	Parcel 210557	Regional Opportunity	0.59	0.34	58%	0.007	0.015
Concord	2	Parcel 149994	Parcel-Based Opportunity	10.00	3.69	37%	0.001	0.015
Concord	2	ROW 10430	ROW Opportunity	3.97	1.89	48%	0.001	0.014
Concord	2	ROW 11163	ROW Opportunity	0.60	0.49	82%	0.007	0.014
Concord	2	ROW 11347	ROW Opportunity	7.18	3.36	47%	0.001	0.014
Concord	2	ROW 13157	ROW Opportunity	10.52	4.40	42%	0.001	0.014
Concord	2	ROW 15822	ROW Opportunity	4.36	2.16	50%	0.001	0.014
Concord	2	ROW 17904	ROW Opportunity	2.21	1.14	52%	0.002	0.014
Concord	2	ROW 19257	ROW Opportunity	4.31	3.48	81%	0.001	0.014
Concord	2	ROW 5809	ROW Opportunity	0.74	0.49	66%	0.006	0.014
Concord	2	ROW 9449	ROW Opportunity	5.91	2.94	50%	0.001	0.014
Concord	2	planned_423	Planned Unlined Bioretention	0.45	0.32	71%	0.009	0.014
Concord	2	Parcel 212241	Parcel-Based Opportunity	10.42	3.26	31%	0.001	0.014

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Concord	2	Parcel 306186	Regional Opportunity	9.66	3.42	35%	0.001	0.014
Concord	2	Parcel 205796	Regional Opportunity	0.51	0.35	69%	0.008	0.014
Concord	2	Parcel 198111	Regional Opportunity	1.88	0.30	16%	0.003	0.014
Concord	2	Parcel 245777	Regional Opportunity	0.52	0.31	60%	0.008	0.014
Concord	2	ROW 13215	ROW Opportunity	10.87	4.95	46%	0.000	0.013
Concord	2	ROW 15854	ROW Opportunity	6.90	3.41	49%	0.001	0.013
Concord	2	ROW 3470	ROW Opportunity	3.85	1.96	51%	0.001	0.013
Concord	2	ROW 425	ROW Opportunity	3.93	1.83	47%	0.001	0.013
Concord	2	ROW 6675	ROW Opportunity	3.24	1.53	47%	0.002	0.013
Concord	2	ROW 9266	ROW Opportunity	3.06	1.20	39%	0.002	0.013
Concord	2	ROW 9426	ROW Opportunity	0.94	0.51	54%	0.004	0.013
Concord	2	Parcel 202662	Parcel-Based Opportunity	4.54	3.47	76%	0.001	0.013
Concord	2	Parcel 207366	Parcel-Based Opportunity	0.44	0.35	80%	0.009	0.013
Concord	2	Parcel 283640	Parcel-Based Opportunity	8.85	3.17	36%	0.001	0.013
Concord	2	Parcel 198956	Regional Opportunity	1.88	0.31	16%	0.002	0.013
Concord	2	Parcel 200446	Regional Opportunity	1.06	0.59	56%	0.004	0.013
Concord	2	Parcel 172659	Parcel-Based Opportunity	8.26	3.21	39%	0.001	0.013
Concord	2	Parcel 176235	Parcel-Based Opportunity	0.43	0.29	67%	0.009	0.013
Concord	2	Parcel 245349	Parcel-Based Opportunity	0.50	0.29	58%	0.007	0.013
Concord	2	ROW 10746	ROW Opportunity	5.86	2.84	48%	0.001	0.012
Concord	2	ROW 12239	ROW Opportunity	6.14	3.06	50%	0.001	0.012
Concord	2	ROW 12681	ROW Opportunity	6.89	3.12	45%	0.001	0.012
Concord	2	ROW 13166	ROW Opportunity	2.36	1.19	50%	0.002	0.012
Concord	2	ROW 14679	ROW Opportunity	6.33	3.08	49%	0.001	0.012
Concord	2	ROW 17761	ROW Opportunity	3.82	2.04	53%	0.001	0.012
Concord	2	ROW 18425	ROW Opportunity	2.25	1.39	62%	0.002	0.012
Concord	2	ROW 19367	ROW Opportunity	5.72	2.91	51%	0.001	0.012
Concord	2	ROW 19741	ROW Opportunity	15.61	6.71	43%	0.000	0.012
Concord	2	ROW 311	ROW Opportunity	4.66	2.30	49%	0.001	0.012
Concord	2	ROW 4967	ROW Opportunity	6.62	3.00	45%	0.001	0.012
Concord	2	ROW 7274	ROW Opportunity	5.67	2.85	50%	0.001	0.012
Concord	2	ROW 9397	ROW Opportunity	6.20	3.03	49%	0.001	0.012
Concord	2	Parcel 304455	Parcel-Based Opportunity	9.99	2.87	29%	0.001	0.012
Concord	2	ROW 1026	ROW Opportunity	6.02	2.70	45%	0.001	0.011
Concord	2	ROW 10444	ROW Opportunity	1.27	0.76	60%	0.003	0.011
Concord	2	ROW 13801	ROW Opportunity	3.61	1.92	53%	0.001	0.011
Concord	2	ROW 14604	ROW Opportunity	6.37	2.78	44%	0.001	0.011
Concord	2	ROW 15422	ROW Opportunity	3.73	1.82	49%	0.001	0.011
Concord	2	ROW 16761	ROW Opportunity	5.65	2.77	49%	0.001	0.011
Concord	2	ROW 19961	ROW Opportunity	5.36	2.71	51%	0.001	0.011
Concord	2	ROW 20887	ROW Opportunity	1.92	1.00	52%	0.002	0.011
Concord	2	ROW 2166	ROW Opportunity	4.72	3.21	68%	0.001	0.011
Concord	2	ROW 4343	ROW Opportunity	5.13	2.65	52%	0.001	0.011
Concord	2	ROW 6655	ROW Opportunity	5.76	2.88	50%	0.001	0.011
Concord	2	ROW 7547	ROW Opportunity	1.93	1.08	56%	0.002	0.011
Concord	2	ROW 840	ROW Opportunity	4.32	2.13	49%	0.001	0.011
Concord	2	ROW 9171	ROW Opportunity	5.93	2.70	46%	0.001	0.011
Concord	2	ROW 9371	ROW Opportunity	5.95	2.73	46%	0.001	0.011
Concord	2	Parcel 205395	Parcel-Based Opportunity	0.41	0.29	71%	0.008	0.011
Concord	2	ROW 10061	ROW Opportunity	4.84	2.42	50%	0.001	0.010
Concord	2	ROW 10733	ROW Opportunity	0.86	0.41	48%	0.004	0.010
Concord	2	ROW 11044	ROW Opportunity	5.41	2.45	45%	0.001	0.010
Concord	2	ROW 11477	ROW Opportunity	5.28	2.53	48%	0.001	0.010
Concord	2	ROW 12831	ROW Opportunity	4.96	2.38	48%	0.001	0.010
Concord	2	ROW 13104	ROW Opportunity	2.83	1.42	50%	0.002	0.010
Concord	2	ROW 1509	ROW Opportunity	5.06	2.54	50%	0.001	0.010
Concord	2	ROW 16114	ROW Opportunity	4.93	2.46	50%	0.001	0.010
Concord	2	ROW 17227	ROW Opportunity	3.24	2.61	81%	0.001	0.010
Concord	2	ROW 18522	ROW Opportunity	0.90	0.41	46%	0.003	0.010
Concord	2	ROW 18867	ROW Opportunity	0.57	0.30	53%	0.005	0.010
Concord	2	ROW 18875	ROW Opportunity	5.49	2.53	46%	0.001	0.010
Concord	2	ROW 1942	ROW Opportunity	5.76	2.61	45%	0.001	0.010
Concord	2	ROW 21082	ROW Opportunity	4.97	2.38	48%	0.001	0.010
Concord	2	ROW 4931	ROW Opportunity	5.95	2.64	44%	0.001	0.010
Concord	2	ROW 6969	ROW Opportunity	1.44	0.74	51%	0.003	0.010
Concord	2	ROW 7056	ROW Opportunity	5.25	2.45	47%	0.001	0.010
Concord	2	ROW 7644	ROW Opportunity	3.34	2.69	81%	0.001	0.010
Concord	2	ROW 8954	ROW Opportunity	3.65	1.80	49%	0.001	0.010
Concord	2	ROW 9917	ROW Opportunity	5.57	2.54	46%	0.001	0.010
Concord	2	Parcel 219241	Parcel-Based Opportunity	5.43	2.56	47%	0.001	0.010
Concord	2	Parcel 170641	Parcel-Based Opportunity	4.76	2.42	51%	0.001	0.010
Danville	2	ROW 16936	ROW Opportunity	26.82	15.17	57%	0.009	0.751
Danville	2	ROW 3153	ROW Opportunity	22.64	11.45	51%	0.005	0.352
Danville	2	ROW 19015	ROW Opportunity	21.59	9.08	42%	0.004	0.262
Danville	2	ROW 10363	ROW Opportunity	15.43	7.12	46%	0.006	0.253
Danville	2	ROW 8645	ROW Opportunity	6.20	3.01	49%	0.012	0.251
Danville	2	ROW 15495	ROW Opportunity	5.54	2.78	50%	0.013	0.239
Danville	2	ROW 5779	ROW Opportunity	28.86	11.93	41%	0.003	0.236
Danville	2	GIP 00587 / Parcel 5799	Parcel-Based Opportunity (aspirational)	2.40	1.78	74%	0.019	0.151
Danville	2	ROW 6494	ROW Opportunity	13.53	5.65	42%	0.003	0.123
Danville	2	ROW 7569	ROW Opportunity	4.71	1.79	38%	0.008	0.114
Danville	2	ROW 20439	ROW Opportunity	5.20	2.53	49%	0.007	0.105
Danville	2	ROW 6553	ROW Opportunity	22.66	7.42	33%	0.002	0.101
Danville	2	GIP 00586 / Parcel 5515	Parcel-Based Opportunity (aspirational)	2.95	1.12	38%	0.010	0.098
Danville	2	GIP 00584 / Parcel 5309	Parcel-Based Opportunity (aspirational)	1.65	1.09	66%	0.017	0.092
Danville	2	ROW 10751	ROW Opportunity	6.96	2.81	40%	0.005	0.088
Danville	2	Parcel 3595	Regional Opportunity	1.32	0.94	71%	0.018	0.081
Danville	2	GIP 00600	Regional Opportunity (aspirational)	1.39	0.89	64%	0.016	0.078
Danville	2	ROW 16231	ROW Opportunity	1.44	0.71	49%	0.013	0.064
Danville	2	ROW 2419	ROW Opportunity	1.41	0.74	52%	0.014	0.063
Danville	2	ROW 11030	ROW Opportunity	4.70	1.68	36%	0.005	0.062
Danville	2	GIP 00589 / Parcel 8214	Parcel-Based Opportunity (aspirational)	2.13	1.25	59%	0.009	0.061
Danville	2	ROW 15065	ROW Opportunity	3.27	1.45	44%	0.006	0.061
Danville	2	Parcel 84842	Regional Opportunity	2.50	1.28	51%	0.007	0.061

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Danville	2	ROW 8646	ROW Opportunity	1.33	0.71	53%	0.013	0.058
Danville	2	planned 56	Planned Creek/Marsh Restoration	28.05	7.45	27%	0.001	0.054
Danville	2	ROW 13678	ROW Opportunity	1.73	0.69	40%	0.009	0.051
Danville	2	ROW 6273	ROW Opportunity	1.21	0.60	50%	0.012	0.049
Danville	2	GIP 00599	Regional Opportunity (aspirational)	2.00	1.28	64%	0.007	0.048
Danville	2	GIP 00585 / Parcel 5364	Parcel-Based Opportunity (aspirational)	0.86	0.57	66%	0.016	0.047
Danville	2	ROW 7541	ROW Opportunity	4.06	1.59	39%	0.004	0.043
Danville	2	ROW 4229	ROW Opportunity	0.99	0.46	46%	0.013	0.042
Danville	2	ROW 8647	ROW Opportunity	1.24	0.61	49%	0.011	0.042
Danville	2	Parcel 5421	Regional Opportunity	0.73	0.42	58%	0.015	0.036
Danville	2	ROW 11350	ROW Opportunity	4.15	1.41	34%	0.003	0.035
Danville	2	ROW 5386	ROW Opportunity	10.48	3.17	30%	0.001	0.032
Danville	2	GIP 00590 / Parcel 10789	Parcel-Based Opportunity (aspirational)	8.03	1.22	15%	0.001	0.031
Danville	2	Parcel 5684	Regional Opportunity	0.63	0.35	56%	0.015	0.031
Danville	2	ROW 17662	ROW Opportunity	4.65	1.54	33%	0.003	0.030
Danville	2	ROW 20482	ROW Opportunity	4.31	1.27	29%	0.002	0.028
Danville	2	ROW 8243	ROW Opportunity	17.78	6.46	36%	0.001	0.028
Danville	2	ROW 1278	ROW Opportunity	2.38	1.11	47%	0.004	0.027
Danville	2	ROW 6485	ROW Opportunity	27.58	10.93	40%	0.000	0.026
Danville	2	ROW 7899	ROW Opportunity	5.60	1.66	30%	0.002	0.026
Danville	2	ROW 14380	ROW Opportunity	10.15	3.63	36%	0.001	0.025
Danville	2	ROW 2772	ROW Opportunity	8.64	2.88	33%	0.001	0.025
Danville	2	ROW 5569	ROW Opportunity	8.89	2.11	24%	0.001	0.025
Danville	2	ROW 6880	ROW Opportunity	4.97	1.50	30%	0.002	0.025
Danville	2	ROW 17254	ROW Opportunity	0.58	0.26	45%	0.012	0.024
Danville	2	ROW 3171	ROW Opportunity	9.06	3.83	42%	0.001	0.024
Danville	2	ROW 10398	ROW Opportunity	8.60	2.53	29%	0.001	0.023
Danville	2	ROW 18078	ROW Opportunity	4.08	1.19	29%	0.002	0.023
Danville	2	ROW 4663	ROW Opportunity	14.21	5.41	38%	0.001	0.023
Danville	2	ROW 6934	ROW Opportunity	7.87	2.54	32%	0.001	0.023
Danville	2	ROW 12934	ROW Opportunity	9.74	3.39	35%	0.001	0.021
Danville	2	ROW 16006	ROW Opportunity	3.00	1.95	65%	0.003	0.020
Danville	2	ROW 21104	ROW Opportunity	3.31	0.71	21%	0.002	0.020
Danville	2	ROW 13883	ROW Opportunity	5.95	1.96	33%	0.001	0.018
Danville	2	ROW 3169	ROW Opportunity	27.83	11.62	42%	0.000	0.018
Danville	2	ROW 19889	ROW Opportunity	2.38	0.83	35%	0.003	0.017
Danville	2	ROW 4459	ROW Opportunity	4.95	1.71	35%	0.001	0.017
Danville	2	ROW 6502	ROW Opportunity	3.58	1.36	38%	0.002	0.017
Danville	2	Parcel 7023	Parcel-Based Opportunity	4.47	2.08	47%	0.002	0.017
Danville	2	ROW 20045	ROW Opportunity	6.37	1.75	27%	0.001	0.016
Danville	2	ROW 7490	ROW Opportunity	5.22	2.31	44%	0.001	0.016
Danville	2	ROW 8595	ROW Opportunity	10.06	3.71	37%	0.001	0.016
Danville	2	ROW 10387	ROW Opportunity	4.17	1.86	45%	0.002	0.015
Danville	2	ROW 13940	ROW Opportunity	6.12	2.31	38%	0.001	0.015
Danville	2	Parcel 2847	Parcel-Based Opportunity	0.35	0.16	46%	0.012	0.015
Danville	2	ROW 3111	ROW Opportunity	6.77	1.67	25%	0.001	0.014
Danville	2	ROW 7016	ROW Opportunity	3.23	0.99	31%	0.002	0.014
Danville	2	Parcel 2825	Parcel-Based Opportunity	0.35	0.14	40%	0.011	0.014
Danville	2	ROW 10801	ROW Opportunity	10.16	3.65	36%	0.001	0.013
Danville	2	ROW 8639	ROW Opportunity	5.23	1.56	30%	0.001	0.013
Danville	2	ROW 12473	ROW Opportunity	2.77	0.92	33%	0.002	0.012
Danville	2	ROW 13144	ROW Opportunity	6.32	2.32	37%	0.001	0.012
Danville	2	ROW 14418	ROW Opportunity	7.93	2.81	35%	0.001	0.012
Danville	2	ROW 3170	ROW Opportunity	17.87	7.49	42%	0.000	0.012
Danville	2	ROW 8231	ROW Opportunity	3.49	1.32	38%	0.002	0.012
Danville	2	ROW 9408	ROW Opportunity	3.29	1.31	40%	0.002	0.012
Danville	2	ROW 11870	ROW Opportunity	3.31	0.88	27%	0.002	0.011
Danville	2	ROW 12945	ROW Opportunity	3.98	1.15	29%	0.001	0.011
Danville	2	ROW 3876	ROW Opportunity	2.83	1.65	58%	0.002	0.011
Danville	2	ROW 7424	ROW Opportunity	1.37	0.97	71%	0.003	0.011
Danville	2	Parcel 7198	Regional Opportunity	2.07	1.46	71%	0.003	0.011
Danville	2	Parcel 2786	Parcel-Based Opportunity	0.34	0.13	38%	0.009	0.011
Danville	2	ROW 16953	ROW Opportunity	3.02	0.93	31%	0.001	0.010
Danville	2	ROW 19866	ROW Opportunity	6.13	2.19	36%	0.001	0.010
Danville	2	ROW 2262	ROW Opportunity	4.67	1.69	36%	0.001	0.010
Danville	2	ROW 3224	ROW Opportunity	6.67	2.37	36%	0.001	0.010
Danville	2	Parcel 8521	Regional Opportunity	0.89	0.19	21%	0.003	0.010
El Cerrito	2	ROW 57	ROW Opportunity	20.16	12.24	61%	0.008	0.501
El Cerrito	2	ROW 15171	ROW Opportunity	5.98	3.48	58%	0.010	0.215
El Cerrito	2	ROW 55	ROW Opportunity	8.61	5.54	64%	0.008	0.212
El Cerrito	2	planned 99	Planned Unlined Bioretention	3.97	2.99	75%	0.011	0.152
El Cerrito	2	ROW 17243	ROW Opportunity	5.47	3.28	60%	0.007	0.129
El Cerrito	2	planned 131	Planned Unlined Bioretention	10.94	5.84	53%	0.004	0.113
El Cerrito	2	Parcel 120972	Parcel-Based Opportunity	4.68	2.01	43%	0.006	0.100
El Cerrito	2	ROW 9948	ROW Opportunity	3.37	2.16	64%	0.008	0.082
El Cerrito	2	Parcel 121635	Parcel-Based Opportunity	2.11	1.58	75%	0.010	0.071
El Cerrito	2	ROW 3506	ROW Opportunity	4.25	2.52	59%	0.006	0.070
El Cerrito	2	planned 98	Planned Unlined Bioretention	14.94	10.23	68%	0.002	0.068
El Cerrito	2	ROW 10275	ROW Opportunity	2.52	1.58	63%	0.008	0.065
El Cerrito	2	planned 122	Planned Unlined Bioretention	2.79	1.19	43%	0.006	0.060
El Cerrito	2	Parcel 120393	Parcel-Based Opportunity	2.79	1.19	43%	0.006	0.060
El Cerrito	2	ROW 9949	ROW Opportunity	8.99	5.41	60%	0.003	0.055
El Cerrito	2	ROW 6997	ROW Opportunity	2.01	1.26	63%	0.008	0.053
El Cerrito	2	ROW 20173	ROW Opportunity	1.18	0.68	58%	0.012	0.053
El Cerrito	2	ROW 3882	ROW Opportunity	7.74	4.70	61%	0.003	0.053
El Cerrito	2	ROW 5240	ROW Opportunity	14.23	7.45	52%	0.002	0.051
El Cerrito	2	ROW 12667	ROW Opportunity	7.60	4.07	54%	0.003	0.048
El Cerrito	2	ROW 15194	ROW Opportunity	2.45	1.67	68%	0.006	0.044
El Cerrito	2	Parcel 108912	Parcel-Based Opportunity	19.52	10.10	52%	0.001	0.042
El Cerrito	2	ROW 13601	ROW Opportunity	9.94	5.69	57%	0.002	0.038
El Cerrito	2	ROW 18539	ROW Opportunity	3.28	1.97	60%	0.004	0.038
El Cerrito	2	ROW 4566	ROW Opportunity	9.09	4.81	53%	0.002	0.037
El Cerrito	2	Parcel 128153	Parcel-Based Opportunity	2.55	1.76	69%	0.005	0.036
El Cerrito	2	ROW 9950	ROW Opportunity	2.05	1.31	64%	0.006	0.035

Contra Costa Countywide Attainment Strategy  
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El Cerrito	2	planned 389	Planned Creek/Marsh Restoration	1.00	0.66	66%	0.011	0.035
El Cerrito	2	Parcel 133358	Regional Opportunity	1.27	0.75	59%	0.008	0.034
El Cerrito	2	ROW 13602	ROW Opportunity	7.52	4.21	56%	0.002	0.033
El Cerrito	2	ROW 11539	ROW Opportunity	0.79	0.54	68%	0.011	0.029
El Cerrito	2	ROW 13367	ROW Opportunity	8.37	4.33	52%	0.002	0.029
El Cerrito	2	ROW 2251	ROW Opportunity	4.66	2.74	59%	0.003	0.029
El Cerrito	2	ROW 3041	ROW Opportunity	1.55	0.94	61%	0.006	0.029
El Cerrito	2	ROW 6936	ROW Opportunity	9.70	5.56	57%	0.001	0.029
El Cerrito	2	ROW 1264	ROW Opportunity	6.94	3.84	55%	0.002	0.028
El Cerrito	2	Parcel 118487	Parcel-Based Opportunity	1.00	0.55	55%	0.008	0.027
El Cerrito	2	ROW 20541	ROW Opportunity	1.08	0.66	61%	0.008	0.026
El Cerrito	2	planned 89	Planned Unlined Bioretention	80.88	5.47	7%	0.000	0.026
El Cerrito	2	ROW 16009	ROW Opportunity	1.55	0.96	62%	0.005	0.025
El Cerrito	2	ROW 15096	ROW Opportunity	6.18	3.20	52%	0.002	0.024
El Cerrito	2	ROW 6938	ROW Opportunity	6.31	3.67	58%	0.002	0.024
El Cerrito	2	ROW 10958	ROW Opportunity	7.39	4.41	60%	0.001	0.023
El Cerrito	2	ROW 15895	ROW Opportunity	9.74	5.57	57%	0.001	0.023
El Cerrito	2	ROW 20026	ROW Opportunity	0.68	0.54	79%	0.010	0.023
El Cerrito	2	Parcel 129420	Parcel-Based Opportunity	9.98	5.33	53%	0.001	0.023
El Cerrito	2	Parcel 137929	Parcel-Based Opportunity	5.49	2.41	44%	0.002	0.023
El Cerrito	2	ROW 15894	ROW Opportunity	9.10	5.36	59%	0.001	0.022
El Cerrito	2	ROW 11691	ROW Opportunity	5.62	3.28	58%	0.002	0.021
El Cerrito	2	ROW 539	ROW Opportunity	6.98	3.97	57%	0.001	0.021
El Cerrito	2	ROW 20328	ROW Opportunity	4.46	2.50	56%	0.002	0.020
El Cerrito	2	ROW 3523	ROW Opportunity	5.21	2.90	56%	0.002	0.020
El Cerrito	2	ROW 10929	ROW Opportunity	5.36	3.22	60%	0.002	0.018
El Cerrito	2	ROW 11011	ROW Opportunity	4.83	2.80	58%	0.002	0.018
El Cerrito	2	ROW 14649	ROW Opportunity	0.60	0.40	67%	0.009	0.018
El Cerrito	2	ROW 10097	ROW Opportunity	6.15	3.70	60%	0.001	0.017
El Cerrito	2	ROW 15535	ROW Opportunity	4.95	2.77	56%	0.002	0.017
El Cerrito	2	ROW 20028	ROW Opportunity	0.50	0.39	78%	0.010	0.017
El Cerrito	2	ROW 20526	ROW Opportunity	4.64	2.70	58%	0.002	0.017
El Cerrito	2	ROW 6691	ROW Opportunity	7.35	4.29	58%	0.001	0.017
El Cerrito	2	ROW 6694	ROW Opportunity	6.59	3.78	57%	0.001	0.017
El Cerrito	2	ROW 16809	ROW Opportunity	4.87	2.71	56%	0.001	0.016
El Cerrito	2	ROW 6234	ROW Opportunity	1.67	0.95	57%	0.003	0.016
El Cerrito	2	ROW 6911	ROW Opportunity	3.73	2.13	57%	0.002	0.016
El Cerrito	2	ROW 6998	ROW Opportunity	2.36	1.37	58%	0.003	0.016
El Cerrito	2	planned 130	Planned Unlined Bioretention	0.45	0.37	82%	0.011	0.016
El Cerrito	2	ROW 21519	ROW Opportunity	3.43	2.17	63%	0.002	0.015
El Cerrito	2	ROW 3495	ROW Opportunity	0.56	0.36	64%	0.008	0.015
El Cerrito	2	ROW 6367	ROW Opportunity	0.63	0.42	67%	0.007	0.015
El Cerrito	2	Parcel 134601	Parcel-Based Opportunity	5.18	3.92	76%	0.001	0.015
El Cerrito	2	ROW 15196	ROW Opportunity	0.57	0.35	61%	0.007	0.014
El Cerrito	2	ROW 16545	ROW Opportunity	1.24	0.82	66%	0.004	0.014
El Cerrito	2	ROW 5254	ROW Opportunity	1.74	1.09	63%	0.003	0.014
El Cerrito	2	ROW 7864	ROW Opportunity	5.06	2.85	56%	0.001	0.014
El Cerrito	2	ROW 10955	ROW Opportunity	4.39	2.60	59%	0.001	0.013
El Cerrito	2	ROW 13600	ROW Opportunity	0.67	0.42	63%	0.006	0.013
El Cerrito	2	ROW 4340	ROW Opportunity	5.48	3.03	55%	0.001	0.013
El Cerrito	2	ROW 4650	ROW Opportunity	0.62	0.37	60%	0.007	0.013
El Cerrito	2	ROW 5917	ROW Opportunity	4.58	2.67	58%	0.001	0.013
El Cerrito	2	ROW 10802	ROW Opportunity	4.97	2.88	58%	0.001	0.012
El Cerrito	2	ROW 10953	ROW Opportunity	4.85	2.82	58%	0.001	0.012
El Cerrito	2	ROW 13910	ROW Opportunity	0.48	0.28	58%	0.008	0.012
El Cerrito	2	ROW 1672	ROW Opportunity	5.53	3.07	56%	0.001	0.012
El Cerrito	2	ROW 6511	ROW Opportunity	3.16	1.88	59%	0.002	0.012
El Cerrito	2	ROW 9947	ROW Opportunity	0.92	0.61	66%	0.005	0.012
El Cerrito	2	Parcel 376467	Parcel-Based Opportunity	5.15	2.93	57%	0.001	0.012
El Cerrito	2	ROW 6968	ROW Opportunity	0.48	0.36	75%	0.007	0.011
El Cerrito	2	ROW 10930	ROW Opportunity	3.54	2.10	59%	0.001	0.011
El Cerrito	2	ROW 9065	ROW Opportunity	2.03	1.20	59%	0.002	0.011
El Cerrito	2	Parcel 140018	Parcel-Based Opportunity	0.39	0.05	13%	0.008	0.011
El Cerrito	2	ROW 16823	ROW Opportunity	1.58	1.02	65%	0.003	0.010
El Cerrito	2	ROW 15090	ROW Opportunity	4.58	2.54	55%	0.001	0.010
El Cerrito	2	ROW 16543	ROW Opportunity	1.22	0.85	70%	0.003	0.010
El Cerrito	2	ROW 1711	ROW Opportunity	2.35	1.03	44%	0.002	0.010
El Cerrito	2	ROW 17280	ROW Opportunity	3.75	2.18	58%	0.001	0.010
El Cerrito	2	ROW 9952	ROW Opportunity	1.53	0.87	57%	0.003	0.010
El Cerrito	2	Parcel 120884	Regional Opportunity	0.59	0.21	36%	0.005	0.010
Hercules	2	Parcel 253834	Parcel-Based Opportunity	6.24	3.65	58%	0.034	0.860
Hercules	2	Parcel 258137	Parcel-Based Opportunity	11.26	2.85	25%	0.015	0.661
Hercules	2	ROW 1743	ROW Opportunity	10.93	4.33	40%	0.013	0.535
Hercules	2	ROW 15756	ROW Opportunity	4.43	2.04	46%	0.028	0.520
Hercules	2	ROW 13267	ROW Opportunity	3.21	1.44	45%	0.027	0.369
Hercules	2	ROW 20166	ROW Opportunity	8.49	3.53	42%	0.011	0.360
Hercules	2	ROW 16990	ROW Opportunity	5.26	1.32	25%	0.016	0.333
Hercules	2	ROW 16634	ROW Opportunity	3.21	1.39	43%	0.022	0.290
Hercules	2	Parcel 257979	Parcel-Based Opportunity	5.28	1.19	23%	0.013	0.283
Hercules	2	ROW 16909	ROW Opportunity	15.95	6.87	43%	0.005	0.260
Hercules	2	ROW 16911	ROW Opportunity	3.92	1.61	41%	0.016	0.247
Hercules	2	ROW 16090	ROW Opportunity	2.62	1.05	40%	0.022	0.243
Hercules	2	Parcel 257367	Parcel-Based Opportunity	3.87	0.86	22%	0.014	0.224
Hercules	2	ROW 14290	ROW Opportunity	6.27	2.06	33%	0.009	0.223
Hercules	2	ROW 6342	ROW Opportunity	2.63	0.75	29%	0.019	0.206
Hercules	2	ROW 19139	ROW Opportunity	3.17	0.80	25%	0.015	0.195
Hercules	2	ROW 18985	ROW Opportunity	21.38	7.42	35%	0.003	0.173
Hercules	2	Parcel 258157	Regional Opportunity	2.95	0.60	20%	0.014	0.167
Hercules	2	ROW 10622	ROW Opportunity	1.33	0.63	47%	0.028	0.160
Hercules	2	ROW 10623	ROW Opportunity	2.15	1.01	47%	0.017	0.153
Hercules	2	ROW 15482	ROW Opportunity	1.75	0.48	27%	0.020	0.141
Hercules	2	ROW 20676	ROW Opportunity	1.62	0.73	45%	0.021	0.140
Hercules	2	ROW 20171	ROW Opportunity	1.96	0.83	42%	0.016	0.125
Hercules	2	ROW 15483	ROW Opportunity	5.37	1.35	25%	0.006	0.115

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Hercules	2	Parcel 257429	Regional Opportunity	1.90	0.43	23%	0.015	0.111
Hercules	2	ROW 1748	ROW Opportunity	1.51	0.39	26%	0.018	0.109
Hercules	2	Parcel 256321	Parcel-Based Opportunity	2.36	0.25	11%	0.010	0.097
Hercules	2	ROW 19622	ROW Opportunity	2.25	0.81	36%	0.011	0.095
Hercules	2	ROW 1435	ROW Opportunity	1.57	0.35	22%	0.014	0.086
Hercules	2	ROW 13170	ROW Opportunity	0.60	0.27	45%	0.026	0.067
Hercules	2	Parcel 257692	Regional Opportunity	0.96	0.22	23%	0.015	0.059
Hercules	2	ROW 1791	ROW Opportunity	1.59	0.35	22%	0.009	0.058
Hercules	2	ROW 6380	ROW Opportunity	0.41	0.24	59%	0.033	0.058
Hercules	2	ROW 7393	ROW Opportunity	1.06	0.36	34%	0.014	0.057
Hercules	2	ROW 7699	ROW Opportunity	0.56	0.19	34%	0.023	0.054
Hercules	2	ROW 17257	ROW Opportunity	0.40	0.21	53%	0.030	0.052
Hercules	2	ROW 10624	ROW Opportunity	0.39	0.17	44%	0.027	0.044
Hercules	2	ROW 7341	ROW Opportunity	0.35	0.15	43%	0.026	0.039
Hercules	2	ROW 1079	ROW Opportunity	0.90	0.39	43%	0.010	0.033
Hercules	2	ROW 11067	ROW Opportunity	7.42	2.66	36%	0.002	0.033
Hercules	2	ROW 365	ROW Opportunity	0.21	0.11	52%	0.029	0.026
Hercules	2	Parcel 257844	Parcel-Based Opportunity	0.43	0.10	23%	0.015	0.025
Hercules	2	ROW 11619	ROW Opportunity	0.42	0.12	29%	0.015	0.024
Hercules	2	Parcel 257823	Parcel-Based Opportunity	0.37	0.08	22%	0.015	0.022
Hercules	2	Parcel 257685	Parcel-Based Opportunity	0.34	0.08	24%	0.015	0.020
Hercules	2	ROW 19683	ROW Opportunity	0.49	0.17	35%	0.010	0.019
Hercules	2	Parcel 260776	Parcel-Based Opportunity	11.52	2.65	23%	0.001	0.019
Hercules	2	Parcel 254443	Parcel-Based Opportunity	8.83	1.56	18%	0.001	0.016
Hercules	2	ROW 2481	ROW Opportunity	0.15	0.07	47%	0.022	0.014
Hercules	2	Parcel 255602	Parcel-Based Opportunity	13.98	5.74	41%	0.000	0.013
Hercules	2	ROW 21077	ROW Opportunity	1.10	0.21	19%	0.003	0.012
Hercules	2	ROW 17543	ROW Opportunity	0.12	0.04	33%	0.022	0.011
Hercules	2	Parcel 253250	Parcel-Based Opportunity	0.32	0.10	31%	0.008	0.010
Lafayette	2	ROW 8037	ROW Opportunity	4.09	2.48	61%	0.014	0.183
Lafayette	2	ROW 2243	ROW Opportunity	1.43	1.06	74%	0.032	0.167
Lafayette	2	ROW 12876	ROW Opportunity	6.73	3.27	49%	0.008	0.153
Lafayette	2	ROW 151	ROW Opportunity	3.55	2.15	61%	0.014	0.153
Lafayette	2	ROW 397	ROW Opportunity	10.95	2.47	23%	0.004	0.132
Lafayette	2	ROW 10450	ROW Opportunity	2.88	1.58	55%	0.013	0.126
Lafayette	2	ROW 8546	ROW Opportunity	30.28	4.86	16%	0.002	0.126
Lafayette	2	ROW 8982	ROW Opportunity	8.86	3.34	38%	0.004	0.097
Lafayette	2	ROW 2803	ROW Opportunity	2.21	1.37	62%	0.012	0.079
Lafayette	2	Parcel 375734	Parcel-Based Opportunity	29.49	9.07	31%	0.001	0.077
Lafayette	2	ROW 235	ROW Opportunity	2.40	1.49	62%	0.011	0.075
Lafayette	2	Parcel 22842	Parcel-Based Opportunity	26.65	4.08	15%	0.001	0.061
Lafayette	2	Parcel 38918	Parcel-Based Opportunity	17.79	6.51	37%	0.001	0.056
Lafayette	2	ROW 5749	ROW Opportunity	2.52	1.23	49%	0.007	0.051
Lafayette	2	ROW 16160	ROW Opportunity	13.26	2.44	18%	0.002	0.050
Lafayette	2	ROW 18657	ROW Opportunity	1.15	0.72	63%	0.013	0.045
Lafayette	2	ROW 6188	ROW Opportunity	2.68	1.13	42%	0.006	0.042
Lafayette	2	ROW 8493	ROW Opportunity	5.88	1.11	19%	0.003	0.041
Lafayette	2	Parcel 45274	Regional Opportunity	0.74	0.44	59%	0.016	0.040
Lafayette	2	ROW 12869	ROW Opportunity	11.00	2.85	26%	0.002	0.039
Lafayette	2	ROW 12445	ROW Opportunity	4.44	0.97	22%	0.003	0.037
Lafayette	2	ROW 17249	ROW Opportunity	4.54	1.96	43%	0.003	0.037
Lafayette	2	ROW 18068	ROW Opportunity	1.26	0.64	51%	0.010	0.037
Lafayette	2	ROW 15000	ROW Opportunity	1.59	0.80	50%	0.007	0.036
Lafayette	2	ROW 7204	ROW Opportunity	0.97	0.35	36%	0.011	0.034
Lafayette	2	ROW 17831	ROW Opportunity	14.18	3.00	21%	0.001	0.033
Lafayette	2	ROW 21105	ROW Opportunity	1.83	0.76	42%	0.006	0.030
Lafayette	2	ROW 18408	ROW Opportunity	7.32	1.94	27%	0.002	0.029
Lafayette	2	ROW 3774	ROW Opportunity	0.85	0.48	56%	0.011	0.029
Lafayette	2	ROW 7943	ROW Opportunity	9.50	1.66	17%	0.001	0.029
Lafayette	2	ROW 8461	ROW Opportunity	0.61	0.39	64%	0.015	0.029
Lafayette	2	Parcel 40931	Parcel-Based Opportunity	6.84	3.62	53%	0.002	0.029
Lafayette	2	Parcel 376452	Parcel-Based Opportunity	9.70	3.28	34%	0.001	0.029
Lafayette	2	Parcel 43618	Parcel-Based Opportunity	7.13	3.51	49%	0.002	0.029
Lafayette	2	ROW 13640	ROW Opportunity	2.39	0.70	29%	0.004	0.028
Lafayette	2	ROW 19821	ROW Opportunity	13.08	2.06	16%	0.001	0.027
Lafayette	2	ROW 8508	ROW Opportunity	1.56	0.60	38%	0.006	0.027
Lafayette	2	planned_546	Planned Creek/Marsh Restoration	2.12	0.60	28%	0.005	0.027
Lafayette	2	ROW 20225	ROW Opportunity	1.46	0.47	32%	0.006	0.026
Lafayette	2	ROW 11383	ROW Opportunity	8.22	1.99	24%	0.001	0.022
Lafayette	2	ROW 680	ROW Opportunity	1.59	0.67	42%	0.005	0.022
Lafayette	2	ROW 9300	ROW Opportunity	1.68	0.70	42%	0.005	0.022
Lafayette	2	ROW 12963	ROW Opportunity	5.60	1.60	29%	0.002	0.021
Lafayette	2	ROW 2256	ROW Opportunity	0.32	0.25	78%	0.020	0.021
Lafayette	2	ROW 155	ROW Opportunity	2.84	1.02	36%	0.003	0.020
Lafayette	2	ROW 2070	ROW Opportunity	2.66	1.20	45%	0.003	0.020
Lafayette	2	Parcel 41948	Regional Opportunity	0.54	0.21	39%	0.011	0.020
Lafayette	2	ROW 21071	ROW Opportunity	0.48	0.22	46%	0.012	0.018
Lafayette	2	ROW 14991	ROW Opportunity	0.74	0.22	30%	0.007	0.017
Lafayette	2	ROW 20798	ROW Opportunity	1.38	0.59	43%	0.005	0.017
Lafayette	2	ROW 18029	ROW Opportunity	5.83	1.14	20%	0.001	0.015
Lafayette	2	ROW 20971	ROW Opportunity	0.57	0.22	39%	0.008	0.015
Lafayette	2	ROW 7898	ROW Opportunity	7.71	1.06	14%	0.001	0.014
Lafayette	2	Parcel 40526	Parcel-Based Opportunity	0.40	0.12	30%	0.010	0.014
Lafayette	2	ROW 18768	ROW Opportunity	4.41	1.13	26%	0.001	0.013
Lafayette	2	ROW 2955	ROW Opportunity	3.77	0.91	24%	0.002	0.013
Lafayette	2	ROW 14844	ROW Opportunity	3.47	0.54	16%	0.002	0.012
Lafayette	2	ROW 20581	ROW Opportunity	2.06	0.66	32%	0.002	0.012
Lafayette	2	ROW 3114	ROW Opportunity	4.89	1.20	25%	0.001	0.012
Lafayette	2	Parcel 43103	Parcel-Based Opportunity	8.38	2.44	29%	0.001	0.012
Lafayette	2	ROW 11327	ROW Opportunity	5.07	1.07	21%	0.001	0.011
Lafayette	2	ROW 13216	ROW Opportunity	5.56	0.90	16%	0.001	0.011
Lafayette	2	ROW 16250	ROW Opportunity	2.49	0.97	39%	0.002	0.011
Lafayette	2	ROW 16635	ROW Opportunity	5.34	0.92	17%	0.001	0.011
Lafayette	2	ROW 18973	ROW Opportunity	3.41	0.90	26%	0.001	0.011

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Lafayette	2	ROW 9365	ROW Opportunity	3.71	1.19	32%	0.001	0.011
Lafayette	2	Parcel 104404	Parcel-Based Opportunity	7.73	0.73	9%	0.001	0.011
Lafayette	2	ROW 13133	ROW Opportunity	4.17	0.92	22%	0.001	0.010
Lafayette	2	ROW 16620	ROW Opportunity	4.96	0.85	17%	0.001	0.010
Lafayette	2	ROW 2059	ROW Opportunity	4.09	0.70	17%	0.001	0.010
Lafayette	2	ROW 2177	ROW Opportunity	4.87	0.90	18%	0.001	0.010
Lafayette	2	ROW 4253	ROW Opportunity	0.63	0.32	51%	0.005	0.010
Lafayette	2	ROW 5759	ROW Opportunity	4.91	0.98	20%	0.001	0.010
Martinez	2	planned 7	Planned Creek/Marsh Restoration	94.31	39.77	42%	0.018	6.741
Martinez	2	ROW 11847	ROW Opportunity	18.15	11.75	65%	0.030	2.289
Martinez	2	ROW 9312	ROW Opportunity	15.70	8.30	53%	0.019	1.200
Martinez	2	Parcel 256879	Parcel-Based Opportunity	4.53	3.61	80%	0.044	0.843
Martinez	2	Parcel 258271	Regional Opportunity	11.25	3.16	28%	0.016	0.738
Martinez	2	ROW 2615	ROW Opportunity	4.67	2.85	61%	0.029	0.568
Martinez	2	ROW 17609	ROW Opportunity	3.03	1.75	58%	0.034	0.431
Martinez	2	ROW 1199	ROW Opportunity	10.11	5.56	55%	0.009	0.350
Martinez	2	ROW 12654	ROW Opportunity	2.07	1.21	58%	0.035	0.299
Martinez	2	Parcel 224745	Parcel-Based Opportunity	12.27	5.56	45%	0.006	0.273
Martinez	2	Parcel 256618	Regional Opportunity	1.53	1.15	75%	0.042	0.270
Martinez	2	ROW 9751	ROW Opportunity	3.94	1.30	33%	0.016	0.263
Martinez	2	ROW 1704	ROW Opportunity	2.43	1.03	42%	0.026	0.261
Martinez	2	ROW 613	ROW Opportunity	44.88	20.72	46%	0.002	0.257
Martinez	2	Parcel 257598	Parcel-Based Opportunity	4.12	0.90	22%	0.014	0.241
Martinez	2	ROW 11018	ROW Opportunity	1.72	0.97	56%	0.033	0.237
Martinez	2	ROW 2610	ROW Opportunity	2.98	0.86	29%	0.018	0.218
Martinez	2	ROW 6722	ROW Opportunity	3.14	1.29	41%	0.017	0.214
Martinez	2	ROW 7179	ROW Opportunity	6.38	3.19	50%	0.008	0.192
Martinez	2	ROW 14509	ROW Opportunity	5.63	2.94	52%	0.009	0.176
Martinez	2	ROW 12653	ROW Opportunity	1.13	0.68	60%	0.035	0.165
Martinez	2	ROW 1198	ROW Opportunity	20.20	10.22	51%	0.003	0.158
Martinez	2	Parcel 257469	Parcel-Based Opportunity	1.47	0.63	43%	0.025	0.155
Martinez	2	ROW 2021	ROW Opportunity	3.08	1.19	39%	0.012	0.154
Martinez	2	Parcel 257037	Parcel-Based Opportunity	1.31	0.60	46%	0.027	0.148
Martinez	2	ROW 11846	ROW Opportunity	1.07	0.66	62%	0.031	0.141
Martinez	2	ROW 6258	ROW Opportunity	1.28	0.54	42%	0.025	0.138
Martinez	2	ROW 13093	ROW Opportunity	19.22	8.75	46%	0.003	0.136
Martinez	2	ROW 15102	ROW Opportunity	1.17	0.49	42%	0.026	0.126
Martinez	2	ROW 12899	ROW Opportunity	23.68	11.07	47%	0.002	0.123
Martinez	2	ROW 6843	ROW Opportunity	7.57	3.72	49%	0.005	0.119
Martinez	2	ROW 12656	ROW Opportunity	1.13	0.45	40%	0.024	0.114
Martinez	2	Parcel 259273	Parcel-Based Opportunity	53.05	7.73	15%	0.001	0.110
Martinez	2	planned 375	Planned Unlined Bioretention	0.69	0.47	68%	0.036	0.104
Martinez	2	Parcel 256439	Parcel-Based Opportunity	6.52	4.34	67%	0.005	0.100
Martinez	2	ROW 11617	ROW Opportunity	6.23	3.68	59%	0.005	0.098
Martinez	2	ROW 3734	ROW Opportunity	10.53	5.59	53%	0.003	0.090
Martinez	2	ROW 4932	ROW Opportunity	2.88	1.64	57%	0.008	0.089
Martinez	2	ROW 15103	ROW Opportunity	0.78	0.33	42%	0.026	0.085
Martinez	2	Parcel 257604	Parcel-Based Opportunity	5.42	1.42	26%	0.004	0.081
Martinez	2	ROW 7416	ROW Opportunity	0.97	0.55	57%	0.020	0.078
Martinez	2	ROW 2023	ROW Opportunity	6.59	0.76	12%	0.003	0.076
Martinez	2	ROW 12901	ROW Opportunity	3.64	1.75	48%	0.005	0.070
Martinez	2	ROW 2910	ROW Opportunity	0.47	0.34	72%	0.035	0.069
Martinez	2	Parcel 229067	Regional Opportunity	2.22	1.53	69%	0.008	0.068
Martinez	2	ROW 14854	ROW Opportunity	1.55	1.06	68%	0.012	0.067
Martinez	2	ROW 20611	ROW Opportunity	5.57	3.21	58%	0.004	0.066
Martinez	2	ROW 10676	ROW Opportunity	2.73	1.61	59%	0.007	0.065
Martinez	2	ROW 7853	ROW Opportunity	7.02	3.11	44%	0.003	0.064
Martinez	2	ROW 15451	ROW Opportunity	4.14	2.09	50%	0.005	0.062
Martinez	2	ROW 19814	ROW Opportunity	0.69	0.24	35%	0.021	0.061
Martinez	2	ROW 629	ROW Opportunity	5.08	1.83	36%	0.004	0.060
Martinez	2	ROW 12109	ROW Opportunity	0.35	0.24	69%	0.040	0.058
Martinez	2	Parcel 259114	Parcel-Based Opportunity	9.40	2.23	24%	0.002	0.057
Martinez	2	ROW 11811	ROW Opportunity	3.12	1.63	52%	0.005	0.054
Martinez	2	Parcel 256442	Regional Opportunity	1.80	1.30	72%	0.008	0.053
Martinez	2	Parcel 251682	Parcel-Based Opportunity	32.13	8.78	27%	0.001	0.045
Martinez	2	Parcel 256990	Regional Opportunity	1.38	0.32	23%	0.008	0.043
Martinez	2	ROW 6892	ROW Opportunity	1.90	1.20	63%	0.006	0.040
Martinez	2	ROW 15020	ROW Opportunity	9.04	2.92	32%	0.002	0.039
Martinez	2	ROW 8221	ROW Opportunity	6.16	3.05	50%	0.002	0.039
Martinez	2	Parcel 232523	Regional Opportunity	1.40	0.76	54%	0.007	0.039
Martinez	2	ROW 610	ROW Opportunity	15.31	6.60	43%	0.001	0.034
Martinez	2	ROW 3856	ROW Opportunity	20.44	8.96	44%	0.001	0.034
Martinez	2	planned 372	Planned Unlined Bioretention	1.66	0.92	55%	0.006	0.033
Martinez	2	Parcel 256108	Regional Opportunity	0.92	0.73	79%	0.010	0.032
Martinez	2	Parcel 258236	Parcel-Based Opportunity	0.33	0.22	67%	0.024	0.032
Martinez	2	ROW 6905	ROW Opportunity	1.95	0.94	48%	0.005	0.030
Martinez	2	Parcel 222314	Regional Opportunity	1.35	0.61	45%	0.006	0.030
Martinez	2	Parcel 255702	Regional Opportunity	0.92	0.66	72%	0.009	0.029
Martinez	2	Parcel 256354	Regional Opportunity	0.89	0.65	73%	0.009	0.029
Martinez	2	ROW 8871	ROW Opportunity	2.44	1.23	50%	0.004	0.028
Martinez	2	ROW 6891	ROW Opportunity	7.35	3.61	49%	0.002	0.027
Martinez	2	Parcel 256320	Regional Opportunity	0.91	0.61	67%	0.008	0.027
Martinez	2	Parcel 256422	Regional Opportunity	0.76	0.50	66%	0.010	0.027
Martinez	2	Parcel 253376	Regional Opportunity	1.62	0.94	58%	0.005	0.026
Martinez	2	Parcel 254721	Regional Opportunity	1.16	0.53	46%	0.006	0.024
Martinez	2	ROW 7604	ROW Opportunity	2.87	1.45	51%	0.003	0.023
Martinez	2	Parcel 224949	Regional Opportunity	0.86	0.49	57%	0.008	0.023
Martinez	2	Parcel 237827	Regional Opportunity	0.71	0.52	73%	0.009	0.023
Martinez	2	Parcel 256502	Parcel-Based Opportunity	0.42	0.31	74%	0.014	0.023
Martinez	2	Parcel 253818	Parcel-Based Opportunity	13.01	5.66	44%	0.001	0.023
Martinez	2	ROW 20289	ROW Opportunity	7.12	3.17	45%	0.001	0.022
Martinez	2	ROW 14857	ROW Opportunity	17.86	8.48	47%	0.000	0.022
Martinez	2	ROW 7211	ROW Opportunity	6.08	2.85	47%	0.002	0.022
Martinez	2	Parcel 258083	Parcel-Based Opportunity	35.65	4.18	12%	0.000	0.021

Contra Costa Countywide Attainment Strategy  
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Martinez	2	ROW 2025	ROW Opportunity	9.51	4.84	51%	0.001	0.020
Martinez	2	Parcel 243866	Parcel-Based Opportunity	14.00	5.43	39%	0.001	0.020
Martinez	2	ROW 14205	ROW Opportunity	6.33	3.34	53%	0.001	0.019
Martinez	2	ROW 20345	ROW Opportunity	5.01	2.30	46%	0.002	0.019
Martinez	2	ROW 9574	ROW Opportunity	1.17	0.62	53%	0.005	0.019
Martinez	2	Parcel 223914	Regional Opportunity	0.85	0.39	46%	0.006	0.019
Martinez	2	Parcel 258983	Regional Opportunity	122.27	7.70	6%	0.000	0.019
Martinez	2	ROW 16176	ROW Opportunity	9.36	4.21	45%	0.001	0.018
Martinez	2	ROW 631	ROW Opportunity	3.69	1.73	47%	0.002	0.018
Martinez	2	Parcel 255585	Regional Opportunity	0.57	0.42	74%	0.009	0.018
Martinez	2	ROW 6965	ROW Opportunity	3.36	1.76	52%	0.002	0.017
Martinez	2	ROW 9879	ROW Opportunity	0.73	0.41	56%	0.007	0.017
Martinez	2	Parcel 225041	Regional Opportunity	0.74	0.35	47%	0.007	0.017
Martinez	2	planned 376	Planned Unlined Bioretention	0.53	0.37	70%	0.009	0.016
Martinez	2	Parcel 253606	Parcel-Based Opportunity	0.49	0.36	73%	0.009	0.016
Martinez	2	Parcel 255151	Regional Opportunity	0.55	0.35	64%	0.008	0.016
Martinez	2	ROW 12471	ROW Opportunity	5.06	2.37	47%	0.001	0.015
Martinez	2	ROW 12911	ROW Opportunity	4.33	2.19	51%	0.002	0.015
Martinez	2	Parcel 225722	Parcel-Based Opportunity	0.34	0.06	18%	0.011	0.015
Martinez	2	ROW 12492	ROW Opportunity	5.90	2.58	44%	0.001	0.014
Martinez	2	ROW 14285	ROW Opportunity	3.17	1.67	53%	0.002	0.014
Martinez	2	ROW 14410	ROW Opportunity	0.55	0.30	55%	0.007	0.014
Martinez	2	ROW 1464	ROW Opportunity	1.92	0.74	39%	0.003	0.014
Martinez	2	ROW 20556	ROW Opportunity	1.78	0.79	44%	0.003	0.014
Martinez	2	ROW 7828	ROW Opportunity	1.92	0.94	49%	0.003	0.014
Martinez	2	ROW 9180	ROW Opportunity	1.23	0.59	48%	0.004	0.014
Martinez	2	ROW 4933	ROW Opportunity	2.81	1.45	52%	0.002	0.013
Martinez	2	ROW 12005	ROW Opportunity	1.77	0.96	54%	0.003	0.013
Martinez	2	Parcel 255587	Parcel-Based Opportunity	0.37	0.29	78%	0.010	0.013
Martinez	2	ROW 14540	ROW Opportunity	0.51	0.25	49%	0.007	0.012
Martinez	2	ROW 15897	ROW Opportunity	3.30	1.73	52%	0.002	0.012
Martinez	2	ROW 20804	ROW Opportunity	4.55	2.34	51%	0.001	0.012
Martinez	2	ROW 4230	ROW Opportunity	1.56	0.52	33%	0.003	0.012
Martinez	2	ROW 6703	ROW Opportunity	0.74	0.43	58%	0.005	0.012
Martinez	2	Parcel 214775	Parcel-Based Opportunity	9.97	2.81	28%	0.001	0.012
Martinez	2	Parcel 238844	Parcel-Based Opportunity	14.31	3.94	28%	0.000	0.012
Martinez	2	ROW 12317	ROW Opportunity	0.64	0.34	53%	0.005	0.011
Martinez	2	ROW 16580	ROW Opportunity	1.80	0.75	42%	0.002	0.011
Martinez	2	ROW 20704	ROW Opportunity	5.72	2.55	45%	0.001	0.011
Martinez	2	planned 373	Planned Unlined Bioretention	1.59	0.50	31%	0.002	0.011
Martinez	2	Parcel 240285	Parcel-Based Opportunity	11.54	3.74	32%	0.000	0.011
Martinez	2	Parcel 256903	Parcel-Based Opportunity	0.23	0.11	48%	0.012	0.011
Martinez	2	Parcel 255494	Parcel-Based Opportunity	0.28	0.25	89%	0.011	0.011
Martinez	2	Parcel 252998	Parcel-Based Opportunity	8.29	4.83	58%	0.000	0.011
Martinez	2	ROW 12318	ROW Opportunity	2.07	1.11	54%	0.002	0.010
Martinez	2	ROW 19347	ROW Opportunity	0.79	0.42	53%	0.004	0.010
Martinez	2	ROW 3406	ROW Opportunity	5.91	2.42	41%	0.001	0.010
Martinez	2	ROW 8404	ROW Opportunity	1.34	0.67	50%	0.003	0.010
Martinez	2	Parcel 224976	Parcel-Based Opportunity	0.45	0.21	47%	0.006	0.010
Martinez	2	Parcel 255781	Parcel-Based Opportunity	0.46	0.23	50%	0.006	0.010
Moraga	2	ROW 17250	ROW Opportunity	11.07	3.64	33%	0.016	0.647
Moraga	2	planned 1316	Planned Unlined Bioretention	2.98	1.05	35%	0.026	0.293
Moraga	2	Parcel 10950	Regional Opportunity	1.14	0.34	30%	0.041	0.185
Moraga	2	Parcel 10961	Regional Opportunity	1.15	0.30	26%	0.037	0.170
Moraga	2	ROW 12878	ROW Opportunity	4.53	1.88	42%	0.008	0.111
Moraga	2	Parcel 26092	Parcel-Based Opportunity	38.99	10.31	26%	0.001	0.106
Moraga	2	ROW 12881	ROW Opportunity	11.85	3.71	31%	0.003	0.072
Moraga	2	Parcel 12163	Parcel-Based Opportunity	43.07	7.49	17%	0.001	0.069
Moraga	2	Parcel 13537	Parcel-Based Opportunity	50.27	8.81	18%	0.000	0.067
Moraga	2	Parcel 7723	Parcel-Based Opportunity	24.01	5.65	24%	0.001	0.056
Moraga	2	ROW 3145	ROW Opportunity	19.33	5.50	28%	0.001	0.049
Moraga	2	ROW 10626	ROW Opportunity	13.66	3.97	29%	0.001	0.041
Moraga	2	ROW 4748	ROW Opportunity	14.73	3.93	27%	0.001	0.041
Moraga	2	ROW 3392	ROW Opportunity	10.09	4.09	41%	0.002	0.032
Moraga	2	ROW 19295	ROW Opportunity	9.79	2.99	31%	0.001	0.030
Moraga	2	Parcel 6384	Parcel-Based Opportunity	9.48	3.19	34%	0.002	0.030
Moraga	2	ROW 15965	ROW Opportunity	9.83	3.12	32%	0.001	0.028
Moraga	2	ROW 16744	ROW Opportunity	10.16	2.83	28%	0.001	0.027
Moraga	2	ROW 16992	ROW Opportunity	8.35	2.44	29%	0.001	0.023
Moraga	2	planned 150	Planned Creek/Marsh Restoration	9.22	0.93	10%	0.001	0.015
Moraga	2	ROW 3874	ROW Opportunity	4.29	1.72	40%	0.001	0.013
Moraga	2	Parcel 12154	Parcel-Based Opportunity	7.49	1.19	16%	0.001	0.013
Moraga	2	ROW 20532	ROW Opportunity	3.80	1.22	32%	0.002	0.012
Moraga	2	ROW 5547	ROW Opportunity	4.78	1.26	26%	0.001	0.012
Moraga	2	ROW 5710	ROW Opportunity	4.70	1.16	25%	0.001	0.012
Moraga	2	Parcel 12566	Parcel-Based Opportunity	19.96	2.68	13%	0.000	0.012
Moraga	2	Parcel 13376	Parcel-Based Opportunity	9.49	0.66	7%	0.001	0.012
Moraga	2	Parcel 13461	Parcel-Based Opportunity	4.70	1.31	28%	0.001	0.012
Moraga	2	ROW 20599	ROW Opportunity	3.96	1.17	30%	0.001	0.011
Moraga	2	ROW 3147	ROW Opportunity	3.36	1.24	37%	0.002	0.011
Moraga	2	Parcel 9225	Parcel-Based Opportunity	6.43	1.25	19%	0.001	0.011
Moraga	2	ROW 12598	ROW Opportunity	3.52	1.17	33%	0.001	0.010
Moraga	2	ROW 21343	ROW Opportunity	3.59	1.02	28%	0.001	0.010
Moraga	2	Parcel 3748	Parcel-Based Opportunity	8.12	0.56	7%	0.001	0.010
Orinda	2	ROW 21614	ROW Opportunity	31.32	10.62	34%	0.002	0.104
Orinda	2	Parcel 44823	Parcel-Based Opportunity	16.20	4.76	29%	0.001	0.046
Orinda	2	Parcel 46205	Parcel-Based Opportunity	22.26	2.96	13%	0.001	0.041
Orinda	2	ROW 9556	ROW Opportunity	15.77	2.91	18%	0.001	0.034
Orinda	2	Parcel 13835	Parcel-Based Opportunity	11.63	3.16	27%	0.001	0.030
Orinda	2	Parcel 49552	Parcel-Based Opportunity	28.42	2.67	9%	0.000	0.029
Orinda	2	ROW 1107	ROW Opportunity	7.07	1.26	18%	0.001	0.018
Orinda	2	ROW 11198	ROW Opportunity	11.30	1.45	13%	0.001	0.018
Orinda	2	Parcel 29088	Parcel-Based Opportunity	6.41	1.86	29%	0.001	0.018
Orinda	2	ROW 19957	ROW Opportunity	9.06	1.12	12%	0.001	0.017



Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Orinda	2	ROW 9077	ROW Opportunity	7.88	1.15	15%	0.001	0.017
Orinda	2	ROW 4721	ROW Opportunity	6.01	1.19	20%	0.001	0.015
Orinda	2	Parcel 47119	Parcel-Based Opportunity	10.58	0.76	7%	0.001	0.014
Orinda	2	Parcel 36062	Parcel-Based Opportunity	3.19	1.35	42%	0.002	0.013
Orinda	2	ROW 7202	ROW Opportunity	5.07	0.93	18%	0.001	0.011
Pinole	2	Parcel 254723	Parcel-Based Opportunity	4.41	2.14	49%	0.030	0.532
Pinole	2	ROW 16912	ROW Opportunity	10.96	5.87	54%	0.008	0.283
Pinole	2	ROW 19218	ROW Opportunity	7.85	3.87	49%	0.006	0.158
Pinole	2	ROW 14911	ROW Opportunity	4.68	2.63	56%	0.009	0.147
Pinole	2	ROW 14916	ROW Opportunity	9.85	4.50	46%	0.005	0.141
Pinole	2	ROW 20585	ROW Opportunity	1.13	0.71	63%	0.027	0.122
Pinole	2	ROW 1018	ROW Opportunity	2.13	1.30	61%	0.008	0.059
Pinole	2	ROW 15540	ROW Opportunity	8.95	3.99	45%	0.003	0.059
Pinole	2	Parcel 230897	Regional Opportunity	2.72	1.22	45%	0.006	0.056
Pinole	2	ROW 15484	ROW Opportunity	0.95	0.39	41%	0.014	0.052
Pinole	2	ROW 18207	ROW Opportunity	0.78	0.47	60%	0.017	0.050
Pinole	2	ROW 14605	ROW Opportunity	2.38	1.39	58%	0.006	0.047
Pinole	2	Parcel 230869	Regional Opportunity	1.51	0.94	62%	0.009	0.044
Pinole	2	Parcel 232274	Parcel-Based Opportunity	22.08	9.87	45%	0.001	0.040
Pinole	2	ROW 6874	ROW Opportunity	9.82	4.43	45%	0.002	0.038
Pinole	2	ROW 7727	ROW Opportunity	0.61	0.33	54%	0.014	0.033
Pinole	2	Parcel 221780	Regional Opportunity	3.09	1.00	32%	0.003	0.032
Pinole	2	ROW 7150	ROW Opportunity	2.17	1.19	55%	0.005	0.030
Pinole	2	Parcel 245647	Regional Opportunity	0.88	0.67	76%	0.010	0.029
Pinole	2	Parcel 247794	Parcel-Based Opportunity	0.30	0.08	27%	0.019	0.023
Pinole	2	ROW 12194	ROW Opportunity	3.86	1.94	50%	0.002	0.022
Pinole	2	ROW 3363	ROW Opportunity	5.11	2.55	50%	0.002	0.022
Pinole	2	ROW 5887	ROW Opportunity	13.54	5.22	39%	0.001	0.022
Pinole	2	Parcel 245383	Regional Opportunity	0.65	0.49	75%	0.010	0.022
Pinole	2	ROW 5599	ROW Opportunity	1.98	1.15	58%	0.004	0.021
Pinole	2	ROW 15034	ROW Opportunity	1.70	0.94	55%	0.004	0.020
Pinole	2	Parcel 243023	Parcel-Based Opportunity	9.49	5.01	53%	0.001	0.020
Pinole	2	ROW 13497	ROW Opportunity	6.04	3.06	51%	0.002	0.019
Pinole	2	ROW 17159	ROW Opportunity	7.51	3.24	43%	0.001	0.019
Pinole	2	ROW 5886	ROW Opportunity	4.30	2.40	56%	0.002	0.018
Pinole	2	Parcel 219618	Parcel-Based Opportunity	13.15	4.37	33%	0.001	0.018
Pinole	2	Parcel 247475	Parcel-Based Opportunity	0.12	0.08	67%	0.038	0.018
Pinole	2	ROW 1742	ROW Opportunity	4.13	1.95	47%	0.002	0.017
Pinole	2	ROW 11596	ROW Opportunity	0.67	0.39	58%	0.007	0.016
Pinole	2	ROW 15440	ROW Opportunity	1.90	0.96	51%	0.003	0.016
Pinole	2	ROW 4012	ROW Opportunity	1.39	0.72	52%	0.004	0.016
Pinole	2	ROW 306	ROW Opportunity	1.68	0.94	56%	0.003	0.015
Pinole	2	ROW 1017	ROW Opportunity	0.97	0.42	43%	0.005	0.014
Pinole	2	ROW 13999	ROW Opportunity	0.44	0.22	50%	0.009	0.014
Pinole	2	ROW 293	ROW Opportunity	2.06	1.13	55%	0.003	0.014
Pinole	2	ROW 15441	ROW Opportunity	0.57	0.38	67%	0.007	0.013
Pinole	2	ROW 15478	ROW Opportunity	1.37	0.77	56%	0.003	0.013
Pinole	2	ROW 16159	ROW Opportunity	1.46	0.86	59%	0.003	0.013
Pinole	2	ROW 14913	ROW Opportunity	3.64	1.88	52%	0.002	0.012
Pinole	2	ROW 16077	ROW Opportunity	1.72	0.80	47%	0.003	0.012
Pinole	2	ROW 7141	ROW Opportunity	1.41	0.78	55%	0.003	0.012
Pinole	2	Parcel 244914	Parcel-Based Opportunity	0.42	0.28	67%	0.009	0.012
Pinole	2	Parcel 249339	Regional Opportunity	0.52	0.26	50%	0.007	0.012
Pinole	2	ROW 14440	ROW Opportunity	1.13	0.42	37%	0.003	0.011
Pinole	2	ROW 1021	ROW Opportunity	1.11	0.49	44%	0.003	0.011
Pinole	2	ROW 4571	ROW Opportunity	5.72	2.53	44%	0.001	0.011
Pinole	2	ROW 15889	ROW Opportunity	0.51	0.20	39%	0.006	0.010
Pinole	2	ROW 646	ROW Opportunity	4.57	2.48	54%	0.001	0.010
Pinole	2	Parcel 249605	Parcel-Based Opportunity	4.61	0.72	16%	0.001	0.010
Pinole	2	Parcel 246543	Parcel-Based Opportunity	0.40	0.23	58%	0.008	0.010
Pittsburg	2	Parcel 352273	Parcel-Based Opportunity	22.24	7.16	32%	0.020	1.973
Pittsburg	2	ROW 6199	ROW Opportunity	17.07	9.41	55%	0.023	1.681
Pittsburg	2	ROW 13238	ROW Opportunity	17.62	9.84	56%	0.016	1.119
Pittsburg	2	ROW 11361	ROW Opportunity	11.26	7.09	63%	0.019	0.891
Pittsburg	2	ROW 7663	ROW Opportunity	8.79	5.55	63%	0.024	0.887
Pittsburg	2	ROW 4315	ROW Opportunity	3.78	2.84	75%	0.040	0.661
Pittsburg	2	ROW 14954	ROW Opportunity	7.36	4.19	57%	0.020	0.642
Pittsburg	2	ROW 2265	ROW Opportunity	3.43	2.47	72%	0.038	0.568
Pittsburg	2	ROW 14958	ROW Opportunity	4.91	3.47	71%	0.026	0.548
Pittsburg	2	Parcel 366531	Parcel-Based Opportunity	6.87	2.53	37%	0.015	0.449
Pittsburg	2	ROW 14798	ROW Opportunity	3.48	2.15	62%	0.028	0.412
Pittsburg	2	ROW 1954	ROW Opportunity	2.50	1.71	68%	0.037	0.401
Pittsburg	2	ROW 3090	ROW Opportunity	5.95	3.72	63%	0.014	0.342
Pittsburg	2	ROW 11359	ROW Opportunity	13.31	7.75	58%	0.007	0.342
Pittsburg	2	ROW 7525	ROW Opportunity	2.93	1.85	63%	0.026	0.326
Pittsburg	2	Parcel 350839	Parcel-Based Opportunity	14.33	6.63	46%	0.006	0.316
Pittsburg	2	ROW 6215	ROW Opportunity	2.16	1.40	65%	0.033	0.310
Pittsburg	2	ROW 6741	ROW Opportunity	2.05	1.30	63%	0.034	0.304
Pittsburg	2	ROW 9457	ROW Opportunity	1.88	1.26	67%	0.036	0.296
Pittsburg	2	ROW 17711	ROW Opportunity	1.60	1.28	80%	0.042	0.292
Pittsburg	2	ROW 7526	ROW Opportunity	5.46	3.95	72%	0.013	0.279
Pittsburg	2	ROW 8562	ROW Opportunity	2.35	1.45	62%	0.027	0.275
Pittsburg	2	ROW 20368	ROW Opportunity	6.68	4.19	63%	0.010	0.251
Pittsburg	2	Parcel 367743	Regional Opportunity	2.24	1.01	45%	0.025	0.247
Pittsburg	2	ROW 8561	ROW Opportunity	7.93	4.62	58%	0.008	0.236
Pittsburg	2	ROW 1955	ROW Opportunity	1.47	0.99	67%	0.036	0.231
Pittsburg	2	ROW 6257	ROW Opportunity	21.27	11.80	55%	0.003	0.231
Pittsburg	2	ROW 21116	ROW Opportunity	8.88	4.83	54%	0.007	0.228
Pittsburg	2	ROW 6280	ROW Opportunity	5.74	3.46	60%	0.010	0.227
Pittsburg	2	ROW 11974	ROW Opportunity	1.43	0.96	67%	0.036	0.226
Pittsburg	2	ROW 8563	ROW Opportunity	12.59	7.66	61%	0.005	0.220
Pittsburg	2	ROW 9582	ROW Opportunity	2.15	1.25	58%	0.023	0.212
Pittsburg	2	Parcel 349390	Parcel-Based Opportunity	6.79	4.68	69%	0.008	0.207
Pittsburg	2	ROW 6226	ROW Opportunity	4.40	2.71	62%	0.011	0.194

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Pittsburg	2	ROW 7859	ROW Opportunity	7.77	4.29	55%	0.007	0.191
Pittsburg	2	ROW 6505	ROW Opportunity	3.76	2.13	57%	0.011	0.170
Pittsburg	2	ROW 15499	ROW Opportunity	1.44	1.06	74%	0.027	0.169
Pittsburg	2	ROW 18481	ROW Opportunity	1.15	0.71	62%	0.033	0.166
Pittsburg	2	ROW 3328	ROW Opportunity	1.31	0.78	60%	0.029	0.165
Pittsburg	2	ROW 3327	ROW Opportunity	1.14	0.65	57%	0.031	0.154
Pittsburg	2	Parcel 363475	Parcel-Based Opportunity	7.77	3.26	42%	0.005	0.150
Pittsburg	2	ROW 8520	ROW Opportunity	3.06	1.75	57%	0.011	0.135
Pittsburg	2	ROW 11360	ROW Opportunity	7.80	4.64	59%	0.005	0.133
Pittsburg	2	ROW 6737	ROW Opportunity	0.93	0.57	61%	0.033	0.133
Pittsburg	2	ROW 20440	ROW Opportunity	1.02	0.53	52%	0.028	0.126
Pittsburg	2	ROW 2855	ROW Opportunity	24.34	12.97	53%	0.002	0.117
Pittsburg	2	ROW 6736	ROW Opportunity	0.84	0.50	60%	0.032	0.117
Pittsburg	2	ROW 6237	ROW Opportunity	2.47	1.38	56%	0.011	0.110
Pittsburg	2	Parcel 362143	Regional Opportunity	0.99	0.41	41%	0.026	0.109
Pittsburg	2	ROW 4561	ROW Opportunity	4.16	2.43	58%	0.007	0.108
Pittsburg	2	ROW 18479	ROW Opportunity	0.76	0.45	59%	0.032	0.106
Pittsburg	2	Parcel 373150	Parcel-Based Opportunity	5.22	2.26	43%	0.005	0.103
Pittsburg	2	ROW 15210	ROW Opportunity	11.75	7.22	61%	0.003	0.093
Pittsburg	2	ROW 21076	ROW Opportunity	0.54	0.34	63%	0.033	0.078
Pittsburg	2	Parcel 367785	Regional Opportunity	1.98	1.79	90%	0.011	0.078
Pittsburg	2	ROW 3879	ROW Opportunity	7.88	4.73	60%	0.003	0.075
Pittsburg	2	ROW 8564	ROW Opportunity	9.90	5.38	54%	0.003	0.074
Pittsburg	2	ROW 5091	ROW Opportunity	19.64	10.50	53%	0.001	0.072
Pittsburg	2	Parcel 361465	Parcel-Based Opportunity	9.00	2.11	23%	0.002	0.072
Pittsburg	2	ROW 20894	ROW Opportunity	1.00	0.63	63%	0.017	0.071
Pittsburg	2	ROW 11324	ROW Opportunity	1.53	1.00	65%	0.012	0.070
Pittsburg	2	ROW 17896	ROW Opportunity	0.57	0.34	60%	0.028	0.070
Pittsburg	2	ROW 9581	ROW Opportunity	1.45	0.88	61%	0.012	0.070
Pittsburg	2	ROW 1336	ROW Opportunity	3.78	2.22	59%	0.005	0.068
Pittsburg	2	Parcel 362407	Regional Opportunity	2.93	1.49	51%	0.006	0.068
Pittsburg	2	Parcel 371128	Parcel-Based Opportunity	14.11	3.86	27%	0.002	0.067
Pittsburg	2	ROW 7571	ROW Opportunity	10.34	5.77	56%	0.002	0.063
Pittsburg	2	Parcel 362118	Regional Opportunity	2.29	1.41	62%	0.008	0.063
Pittsburg	2	ROW 15487	ROW Opportunity	2.36	1.45	61%	0.007	0.062
Pittsburg	2	ROW 6193	ROW Opportunity	3.97	2.52	63%	0.005	0.060
Pittsburg	2	Parcel 362980	Parcel-Based Opportunity	29.43	14.40	49%	0.001	0.058
Pittsburg	2	ROW 5206	ROW Opportunity	3.75	2.42	65%	0.005	0.057
Pittsburg	2	ROW 1284	ROW Opportunity	0.36	0.25	69%	0.036	0.057
Pittsburg	2	ROW 15053	ROW Opportunity	2.48	1.28	52%	0.006	0.055
Pittsburg	2	ROW 18482	ROW Opportunity	0.42	0.22	52%	0.029	0.054
Pittsburg	2	Parcel 374906	Parcel-Based Opportunity	6.68	4.37	65%	0.003	0.054
Pittsburg	2	Parcel 356104	Regional Opportunity	2.28	1.53	67%	0.007	0.053
Pittsburg	2	ROW 6195	ROW Opportunity	6.47	3.95	61%	0.003	0.052
Pittsburg	2	Parcel 370086	Regional Opportunity	1.37	1.18	86%	0.010	0.052
Pittsburg	2	ROW 434	ROW Opportunity	0.36	0.23	64%	0.033	0.051
Pittsburg	2	Parcel 362426	Regional Opportunity	1.89	1.15	61%	0.007	0.051
Pittsburg	2	ROW 11734	ROW Opportunity	3.49	2.06	59%	0.004	0.050
Pittsburg	2	Parcel 358872	Regional Opportunity	1.52	1.10	72%	0.009	0.048
Pittsburg	2	ROW 17448	ROW Opportunity	2.84	1.45	51%	0.005	0.047
Pittsburg	2	ROW 3086	ROW Opportunity	0.45	0.29	64%	0.023	0.045
Pittsburg	2	ROW 16768	ROW Opportunity	0.36	0.19	53%	0.028	0.044
Pittsburg	2	Parcel 363463	Regional Opportunity	2.26	0.96	42%	0.005	0.044
Pittsburg	2	ROW 810	ROW Opportunity	0.26	0.18	69%	0.037	0.043
Pittsburg	2	Parcel 363309	Parcel-Based Opportunity	6.78	2.01	30%	0.002	0.043
Pittsburg	2	ROW 5831	ROW Opportunity	3.02	1.89	63%	0.004	0.041
Pittsburg	2	ROW 6214	ROW Opportunity	3.42	2.08	61%	0.004	0.041
Pittsburg	2	Parcel 371346	Parcel-Based Opportunity	0.24	0.18	75%	0.039	0.041
Pittsburg	2	ROW 5428	ROW Opportunity	4.76	2.60	55%	0.003	0.037
Pittsburg	2	ROW 6228	ROW Opportunity	4.44	2.89	65%	0.003	0.037
Pittsburg	2	ROW 11833	ROW Opportunity	3.89	2.24	58%	0.003	0.036
Pittsburg	2	ROW 762	ROW Opportunity	6.64	3.55	53%	0.002	0.036
Pittsburg	2	ROW 18594	ROW Opportunity	8.91	5.04	57%	0.002	0.035
Pittsburg	2	Parcel 372570	Regional Opportunity	1.35	0.77	57%	0.007	0.035
Pittsburg	2	ROW 18048	ROW Opportunity	4.41	2.71	61%	0.003	0.034
Pittsburg	2	Parcel 374691	Parcel-Based Opportunity	11.06	5.22	47%	0.001	0.034
Pittsburg	2	ROW 1733	ROW Opportunity	1.96	0.93	47%	0.005	0.033
Pittsburg	2	Parcel 368250	Parcel-Based Opportunity	0.32	0.18	56%	0.024	0.033
Pittsburg	2	ROW 2115	ROW Opportunity	1.76	0.97	55%	0.005	0.032
Pittsburg	2	Parcel 348794	Parcel-Based Opportunity	20.29	7.64	38%	0.001	0.032
Pittsburg	2	ROW 17251	ROW Opportunity	8.95	5.16	58%	0.001	0.031
Pittsburg	2	ROW 394	ROW Opportunity	1.85	1.05	57%	0.005	0.031
Pittsburg	2	ROW 15726	ROW Opportunity	3.11	1.83	59%	0.003	0.030
Pittsburg	2	ROW 21525	ROW Opportunity	5.44	2.94	54%	0.002	0.030
Pittsburg	2	ROW 20465	ROW Opportunity	38.58	20.17	52%	0.000	0.029
Pittsburg	2	ROW 14014	ROW Opportunity	1.80	0.94	52%	0.005	0.028
Pittsburg	2	ROW 15496	ROW Opportunity	2.11	1.33	63%	0.004	0.028
Pittsburg	2	ROW 3866	ROW Opportunity	1.39	0.66	47%	0.006	0.028
Pittsburg	2	ROW 6218	ROW Opportunity	1.32	0.86	65%	0.006	0.028
Pittsburg	2	Parcel 361545	Parcel-Based Opportunity	18.57	6.68	36%	0.001	0.028
Pittsburg	2	ROW 2172	ROW Opportunity	3.63	2.26	62%	0.003	0.027
Pittsburg	2	ROW 4032	ROW Opportunity	2.50	1.16	46%	0.003	0.027
Pittsburg	2	Parcel 374956	Parcel-Based Opportunity	7.22	2.76	38%	0.002	0.027
Pittsburg	2	Parcel 351544	Parcel-Based Opportunity	13.19	6.68	51%	0.001	0.027
Pittsburg	2	Parcel 358992	Parcel-Based Opportunity	3.66	2.32	63%	0.003	0.027
Pittsburg	2	ROW 1734	ROW Opportunity	4.43	2.52	57%	0.002	0.026
Pittsburg	2	ROW 20003	ROW Opportunity	12.36	6.63	54%	0.001	0.026
Pittsburg	2	ROW 6217	ROW Opportunity	1.01	0.70	69%	0.007	0.025
Pittsburg	2	Parcel 342146	Parcel-Based Opportunity	12.50	6.01	48%	0.001	0.025
Pittsburg	2	ROW 11064	ROW Opportunity	3.96	2.19	55%	0.002	0.024
Pittsburg	2	ROW 14856	ROW Opportunity	3.11	1.80	58%	0.002	0.024
Pittsburg	2	ROW 16225	ROW Opportunity	4.64	2.66	57%	0.002	0.024
Pittsburg	2	ROW 20398	ROW Opportunity	0.77	0.43	56%	0.008	0.024
Pittsburg	2	Parcel 372876	Regional Opportunity	1.32	0.53	40%	0.005	0.024

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Pittsburg	2	Parcel 373402	Regional Opportunity	1.03	0.53	51%	0.006	0.024
Pittsburg	2	Parcel 348459	Parcel-Based Opportunity	12.96	5.96	46%	0.001	0.024
Pittsburg	2	ROW 11872	ROW Opportunity	2.97	1.69	57%	0.003	0.023
Pittsburg	2	ROW 11358	ROW Opportunity	1.06	0.49	46%	0.006	0.023
Pittsburg	2	ROW 12501	ROW Opportunity	4.54	2.65	58%	0.002	0.023
Pittsburg	2	ROW 20394	ROW Opportunity	1.63	0.97	60%	0.004	0.023
Pittsburg	2	ROW 20627	ROW Opportunity	4.36	2.57	59%	0.002	0.023
Pittsburg	2	ROW 2826	ROW Opportunity	4.45	2.57	58%	0.002	0.023
Pittsburg	2	ROW 6219	ROW Opportunity	1.46	0.92	63%	0.005	0.023
Pittsburg	2	Parcel 362344	Parcel-Based Opportunity	14.44	5.98	41%	0.001	0.023
Pittsburg	2	Parcel 352244	Parcel-Based Opportunity	10.05	5.65	56%	0.001	0.023
Pittsburg	2	ROW 894	ROW Opportunity	4.26	2.49	58%	0.002	0.022
Pittsburg	2	Parcel 366285	Parcel-Based Opportunity	26.81	4.81	18%	0.000	0.022
Pittsburg	2	ROW 11969	ROW Opportunity	0.49	0.26	53%	0.011	0.021
Pittsburg	2	ROW 14500	ROW Opportunity	0.21	0.12	57%	0.024	0.021
Pittsburg	2	ROW 6695	ROW Opportunity	1.68	0.92	55%	0.004	0.021
Pittsburg	2	Parcel 357792	Regional Opportunity	1.23	1.04	85%	0.006	0.021
Pittsburg	2	Parcel 336890	Parcel-Based Opportunity	9.19	5.25	57%	0.001	0.021
Pittsburg	2	ROW 6805	ROW Opportunity	0.65	0.36	55%	0.008	0.020
Pittsburg	2	ROW 12237	ROW Opportunity	8.69	4.66	54%	0.001	0.020
Pittsburg	2	Parcel 372224	Regional Opportunity	0.54	0.37	69%	0.010	0.020
Pittsburg	2	Parcel 355971	Parcel-Based Opportunity	0.38	0.12	32%	0.012	0.020
Pittsburg	2	Parcel 364979	Parcel-Based Opportunity	10.21	5.56	54%	0.001	0.020
Pittsburg	2	Parcel 367368	Parcel-Based Opportunity	11.66	4.87	42%	0.001	0.020
Pittsburg	2	ROW 1520	ROW Opportunity	2.90	1.59	55%	0.002	0.019
Pittsburg	2	ROW 3686	ROW Opportunity	2.00	0.51	26%	0.003	0.019
Pittsburg	2	ROW 6221	ROW Opportunity	1.24	0.79	64%	0.005	0.019
Pittsburg	2	ROW 8940	ROW Opportunity	6.24	4.08	65%	0.001	0.019
Pittsburg	2	ROW 20795	ROW Opportunity	3.72	2.00	54%	0.002	0.018
Pittsburg	2	ROW 14011	ROW Opportunity	0.79	0.44	56%	0.006	0.018
Pittsburg	2	ROW 5463	ROW Opportunity	0.90	0.54	60%	0.006	0.018
Pittsburg	2	ROW 6045	ROW Opportunity	0.75	0.42	56%	0.007	0.018
Pittsburg	2	ROW 11370	ROW Opportunity	0.33	0.21	64%	0.013	0.017
Pittsburg	2	ROW 11603	ROW Opportunity	1.42	0.34	24%	0.003	0.017
Pittsburg	2	ROW 14658	ROW Opportunity	5.25	3.04	58%	0.001	0.017
Pittsburg	2	ROW 20383	ROW Opportunity	5.64	3.31	59%	0.001	0.017
Pittsburg	2	ROW 21083	ROW Opportunity	7.55	4.13	55%	0.001	0.017
Pittsburg	2	ROW 4764	ROW Opportunity	1.16	0.71	61%	0.005	0.017
Pittsburg	2	ROW 5824	ROW Opportunity	2.16	1.07	50%	0.003	0.017
Pittsburg	2	Parcel 374571	Regional Opportunity	0.54	0.38	70%	0.009	0.017
Pittsburg	2	Parcel 372393	Regional Opportunity	0.60	0.37	62%	0.008	0.017
Pittsburg	2	Parcel 348698	Regional Opportunity	0.48	0.40	83%	0.010	0.017
Pittsburg	2	ROW 13380	ROW Opportunity	0.48	0.23	48%	0.009	0.016
Pittsburg	2	ROW 17388	ROW Opportunity	1.59	0.88	55%	0.003	0.016
Pittsburg	2	ROW 5853	ROW Opportunity	1.28	0.74	58%	0.004	0.016
Pittsburg	2	ROW 6194	ROW Opportunity	2.19	1.29	59%	0.002	0.016
Pittsburg	2	ROW 6238	ROW Opportunity	0.61	0.36	59%	0.007	0.016
Pittsburg	2	Parcel 359451	Parcel-Based Opportunity	11.40	4.60	40%	0.001	0.016
Pittsburg	2	Parcel 364198	Parcel-Based Opportunity	10.22	3.89	38%	0.001	0.016
Pittsburg	2	ROW 17358	ROW Opportunity	6.93	3.73	54%	0.001	0.015
Pittsburg	2	ROW 3583	ROW Opportunity	6.04	3.35	55%	0.001	0.015
Pittsburg	2	ROW 6223	ROW Opportunity	2.68	1.66	62%	0.002	0.015
Pittsburg	2	ROW 9712	ROW Opportunity	6.85	3.87	56%	0.001	0.015
Pittsburg	2	ROW 9726	ROW Opportunity	6.75	3.66	54%	0.001	0.015
Pittsburg	2	Parcel 349343	Regional Opportunity	1.12	0.32	29%	0.004	0.015
Pittsburg	2	ROW 11832	ROW Opportunity	1.52	0.86	57%	0.003	0.014
Pittsburg	2	ROW 11900	ROW Opportunity	3.22	1.71	53%	0.002	0.014
Pittsburg	2	ROW 17755	ROW Opportunity	3.00	1.60	53%	0.002	0.014
Pittsburg	2	Parcel 368854	Parcel-Based Opportunity	0.36	0.31	86%	0.010	0.014
Pittsburg	2	ROW 11357	ROW Opportunity	3.17	1.95	62%	0.002	0.013
Pittsburg	2	ROW 12433	ROW Opportunity	6.02	3.27	54%	0.001	0.013
Pittsburg	2	ROW 1329	ROW Opportunity	8.23	4.37	53%	0.001	0.013
Pittsburg	2	planned 431	Planned Unlined Bioretention	0.48	0.31	65%	0.008	0.013
Pittsburg	2	Parcel 371237	Parcel-Based Opportunity	0.43	0.30	70%	0.009	0.013
Pittsburg	2	Parcel 361603	Parcel-Based Opportunity	0.48	0.31	65%	0.008	0.013
Pittsburg	2	Parcel 351110	Parcel-Based Opportunity	107.94	43.80	41%	0.000	0.013
Pittsburg	2	Parcel 358978	Parcel-Based Opportunity	0.25	0.18	72%	0.013	0.013
Pittsburg	2	ROW 10175	ROW Opportunity	6.76	3.47	51%	0.001	0.012
Pittsburg	2	ROW 12638	ROW Opportunity	0.12	0.07	58%	0.025	0.012
Pittsburg	2	ROW 15237	ROW Opportunity	2.52	1.28	51%	0.002	0.012
Pittsburg	2	ROW 20371	ROW Opportunity	5.02	3.02	60%	0.001	0.012
Pittsburg	2	ROW 20374	ROW Opportunity	3.94	2.27	58%	0.001	0.012
Pittsburg	2	ROW 20402	ROW Opportunity	3.81	2.21	58%	0.001	0.012
Pittsburg	2	ROW 20411	ROW Opportunity	4.81	2.95	61%	0.001	0.012
Pittsburg	2	ROW 20801	ROW Opportunity	3.20	1.94	61%	0.002	0.012
Pittsburg	2	ROW 5843	ROW Opportunity	5.08	3.01	59%	0.001	0.012
Pittsburg	2	ROW 6299	ROW Opportunity	5.53	2.99	54%	0.001	0.012
Pittsburg	2	ROW 6474	ROW Opportunity	3.61	1.94	54%	0.001	0.012
Pittsburg	2	Parcel 372099	Parcel-Based Opportunity	0.41	0.26	63%	0.008	0.012
Pittsburg	2	ROW 1196	ROW Opportunity	1.56	0.85	54%	0.002	0.011
Pittsburg	2	ROW 14319	ROW Opportunity	5.30	2.79	53%	0.001	0.011
Pittsburg	2	ROW 15497	ROW Opportunity	0.90	0.77	86%	0.004	0.011
Pittsburg	2	ROW 16028	ROW Opportunity	5.20	2.77	53%	0.001	0.011
Pittsburg	2	ROW 2952	ROW Opportunity	5.23	2.80	54%	0.001	0.011
Pittsburg	2	ROW 9735	ROW Opportunity	4.76	2.79	59%	0.001	0.011
Pittsburg	2	Parcel 353346	Parcel-Based Opportunity	7.56	2.47	33%	0.001	0.011
Pittsburg	2	ROW 1165	ROW Opportunity	4.72	2.45	52%	0.001	0.010
Pittsburg	2	ROW 12867	ROW Opportunity	0.70	0.47	67%	0.004	0.010
Pittsburg	2	ROW 13887	ROW Opportunity	2.43	1.42	58%	0.002	0.010
Pittsburg	2	ROW 15076	ROW Opportunity	9.04	4.91	54%	0.000	0.010
Pittsburg	2	ROW 16855	ROW Opportunity	4.74	2.54	54%	0.001	0.010
Pittsburg	2	ROW 18551	ROW Opportunity	4.33	2.37	55%	0.001	0.010
Pittsburg	2	ROW 20409	ROW Opportunity	3.61	2.22	61%	0.001	0.010
Pittsburg	2	ROW 21513	ROW Opportunity	0.70	0.42	60%	0.004	0.010

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Pittsburg	2	ROW 3332	ROW Opportunity	0.46	0.24	52%	0.006	0.010
Pittsburg	2	ROW 7648	ROW Opportunity	1.98	1.11	56%	0.002	0.010
Pleasant Hill	2	Parcel 149659	Parcel-Based Opportunity	4.69	2.66	57%	0.032	0.628
Pleasant Hill	2	ROW 19233	ROW Opportunity	3.15	2.26	72%	0.039	0.523
Pleasant Hill	2	Parcel 154099	Regional Opportunity	2.85	1.61	56%	0.031	0.380
Pleasant Hill	2	ROW 4670	ROW Opportunity	17.32	8.32	48%	0.005	0.280
Pleasant Hill	2	ROW 19166	ROW Opportunity	30.21	13.52	45%	0.003	0.239
Pleasant Hill	2	Parcel 198405	Parcel-Based Opportunity	96.46	48.68	50%	0.001	0.203
Pleasant Hill	2	Parcel 181521	Parcel-Based Opportunity	9.56	4.74	50%	0.006	0.193
Pleasant Hill	2	ROW 2970	ROW Opportunity	9.37	5.99	64%	0.006	0.181
Pleasant Hill	2	ROW 9267	ROW Opportunity	3.52	1.89	54%	0.013	0.171
Pleasant Hill	2	ROW 20243	ROW Opportunity	2.99	1.93	65%	0.013	0.148
Pleasant Hill	2	ROW 12076	ROW Opportunity	2.33	1.37	59%	0.012	0.111
Pleasant Hill	2	ROW 8317	ROW Opportunity	12.17	5.45	45%	0.003	0.111
Pleasant Hill	2	ROW 15010	ROW Opportunity	21.53	8.73	41%	0.002	0.110
Pleasant Hill	2	ROW 4673	ROW Opportunity	4.72	2.27	48%	0.006	0.103
Pleasant Hill	2	ROW 4671	ROW Opportunity	5.14	2.67	52%	0.006	0.098
Pleasant Hill	2	Parcel 150985	Regional Opportunity	0.77	0.41	53%	0.030	0.098
Pleasant Hill	2	Parcel 161733	Parcel-Based Opportunity	3.53	2.11	60%	0.008	0.094
Pleasant Hill	2	Parcel 142700	Parcel-Based Opportunity	3.60	2.10	58%	0.007	0.093
Pleasant Hill	2	ROW 17670	ROW Opportunity	6.18	3.50	57%	0.004	0.084
Pleasant Hill	2	ROW 5047	ROW Opportunity	3.17	1.88	59%	0.007	0.084
Pleasant Hill	2	ROW 13734	ROW Opportunity	8.72	3.90	45%	0.003	0.079
Pleasant Hill	2	Parcel 186000	Parcel-Based Opportunity	4.15	1.73	42%	0.005	0.079
Pleasant Hill	2	Parcel 185324	Parcel-Based Opportunity	4.04	1.69	42%	0.005	0.077
Pleasant Hill	2	ROW 12853	ROW Opportunity	4.72	2.76	58%	0.005	0.072
Pleasant Hill	2	ROW 2494	ROW Opportunity	14.34	6.19	43%	0.002	0.072
Pleasant Hill	2	ROW 6872	ROW Opportunity	1.64	0.99	60%	0.012	0.072
Pleasant Hill	2	ROW 6671	ROW Opportunity	3.95	1.92	49%	0.005	0.067
Pleasant Hill	2	ROW 13220	ROW Opportunity	3.76	2.25	60%	0.005	0.062
Pleasant Hill	2	Parcel 189822	Parcel-Based Opportunity	26.23	15.34	58%	0.001	0.061
Pleasant Hill	2	ROW 4672	ROW Opportunity	2.09	1.06	51%	0.008	0.060
Pleasant Hill	2	Parcel 173214	Regional Opportunity	2.92	1.24	42%	0.006	0.059
Pleasant Hill	2	ROW 4280	ROW Opportunity	2.43	1.23	51%	0.007	0.058
Pleasant Hill	2	ROW 4377	ROW Opportunity	9.02	4.33	48%	0.002	0.056
Pleasant Hill	2	ROW 5054	ROW Opportunity	2.66	1.53	58%	0.006	0.055
Pleasant Hill	2	planned 143	Planned Water Quality Basin	38.26	17.06	45%	0.001	0.054
Pleasant Hill	2	Parcel 146724	Parcel-Based Opportunity	30.26	12.96	43%	0.001	0.053
Pleasant Hill	2	Parcel 155831	Regional Opportunity	1.32	1.23	93%	0.011	0.053
Pleasant Hill	2	ROW 19602	ROW Opportunity	1.97	1.24	63%	0.007	0.047
Pleasant Hill	2	ROW 8079	ROW Opportunity	14.00	3.93	28%	0.001	0.045
Pleasant Hill	2	ROW 8193	ROW Opportunity	9.91	3.96	40%	0.002	0.045
Pleasant Hill	2	ROW 13735	ROW Opportunity	2.08	1.04	50%	0.006	0.040
Pleasant Hill	2	ROW 13554	ROW Opportunity	6.29	2.86	45%	0.002	0.039
Pleasant Hill	2	Parcel 142400	Regional Opportunity	1.85	0.83	45%	0.006	0.039
Pleasant Hill	2	ROW 14564	ROW Opportunity	7.82	3.13	40%	0.002	0.035
Pleasant Hill	2	Parcel 185980	Regional Opportunity	1.25	0.79	63%	0.008	0.035
Pleasant Hill	2	ROW 17048	ROW Opportunity	1.65	0.76	46%	0.006	0.034
Pleasant Hill	2	ROW 7753	ROW Opportunity	3.18	1.28	40%	0.003	0.034
Pleasant Hill	2	ROW 9560	ROW Opportunity	0.50	0.19	38%	0.017	0.034
Pleasant Hill	2	Parcel 131105	Regional Opportunity	1.45	0.72	50%	0.007	0.034
Pleasant Hill	2	Parcel 185990	Regional Opportunity	1.68	0.71	42%	0.005	0.032
Pleasant Hill	2	ROW 11390	ROW Opportunity	7.82	3.29	42%	0.002	0.031
Pleasant Hill	2	ROW 9880	ROW Opportunity	3.49	1.47	42%	0.003	0.029
Pleasant Hill	2	ROW 13741	ROW Opportunity	1.00	0.63	63%	0.008	0.028
Pleasant Hill	2	Parcel 156974	Parcel-Based Opportunity	9.89	3.33	34%	0.001	0.028
Pleasant Hill	2	ROW 13736	ROW Opportunity	4.01	1.82	45%	0.002	0.027
Pleasant Hill	2	ROW 19478	ROW Opportunity	1.79	0.76	42%	0.004	0.027
Pleasant Hill	2	ROW 6668	ROW Opportunity	4.38	1.90	43%	0.002	0.027
Pleasant Hill	2	Parcel 149937	Regional Opportunity	2.29	1.03	45%	0.004	0.026
Pleasant Hill	2	Parcel 187984	Parcel-Based Opportunity	23.59	5.41	23%	0.000	0.024
Pleasant Hill	2	Parcel 131108	Regional Opportunity	0.82	0.54	66%	0.008	0.024
Pleasant Hill	2	ROW 20206	ROW Opportunity	11.06	5.11	46%	0.001	0.023
Pleasant Hill	2	ROW 2045	ROW Opportunity	2.31	1.12	48%	0.003	0.022
Pleasant Hill	2	ROW 4500	ROW Opportunity	3.13	1.84	59%	0.003	0.022
Pleasant Hill	2	ROW 6670	ROW Opportunity	1.70	0.79	46%	0.004	0.022
Pleasant Hill	2	ROW 11085	ROW Opportunity	3.49	1.68	48%	0.002	0.021
Pleasant Hill	2	ROW 12762	ROW Opportunity	3.17	1.40	44%	0.002	0.021
Pleasant Hill	2	ROW 287	ROW Opportunity	1.37	0.44	32%	0.004	0.021
Pleasant Hill	2	ROW 4178	ROW Opportunity	7.46	3.16	42%	0.001	0.020
Pleasant Hill	2	Parcel 168841	Regional Opportunity	0.97	0.44	45%	0.006	0.020
Pleasant Hill	2	ROW 17703	ROW Opportunity	4.38	1.92	44%	0.002	0.019
Pleasant Hill	2	ROW 15029	ROW Opportunity	3.85	1.58	41%	0.002	0.019
Pleasant Hill	2	ROW 5754	ROW Opportunity	1.34	0.80	60%	0.004	0.019
Pleasant Hill	2	ROW 12009	ROW Opportunity	2.27	1.14	50%	0.003	0.018
Pleasant Hill	2	ROW 17057	ROW Opportunity	2.52	1.13	45%	0.002	0.018
Pleasant Hill	2	ROW 4611	ROW Opportunity	0.64	0.40	63%	0.008	0.018
Pleasant Hill	2	ROW 4886	ROW Opportunity	1.05	0.56	53%	0.005	0.018
Pleasant Hill	2	ROW 6669	ROW Opportunity	1.68	0.82	49%	0.003	0.018
Pleasant Hill	2	Parcel 167223	Parcel-Based Opportunity	10.92	4.29	39%	0.001	0.018
Pleasant Hill	2	ROW 15355	ROW Opportunity	0.64	0.38	59%	0.008	0.017
Pleasant Hill	2	ROW 15358	ROW Opportunity	3.11	1.40	45%	0.002	0.017
Pleasant Hill	2	Parcel 155751	Regional Opportunity	1.57	0.26	17%	0.003	0.017
Pleasant Hill	2	ROW 11244	ROW Opportunity	6.29	2.71	43%	0.001	0.016
Pleasant Hill	2	ROW 12046	ROW Opportunity	9.42	3.82	41%	0.001	0.016
Pleasant Hill	2	ROW 1343	ROW Opportunity	1.63	0.72	44%	0.003	0.016
Pleasant Hill	2	ROW 3210	ROW Opportunity	7.82	3.31	42%	0.001	0.016
Pleasant Hill	2	ROW 533	ROW Opportunity	2.07	0.90	43%	0.003	0.016
Pleasant Hill	2	Parcel 155321	Regional Opportunity	0.56	0.36	64%	0.008	0.016
Pleasant Hill	2	ROW 5966	ROW Opportunity	3.55	1.52	43%	0.002	0.015
Pleasant Hill	2	ROW 5767	ROW Opportunity	2.66	1.19	45%	0.002	0.015
Pleasant Hill	2	Parcel 178916	Parcel-Based Opportunity	3.76	2.58	69%	0.002	0.015
Pleasant Hill	2	ROW 13223	ROW Opportunity	1.24	0.62	50%	0.004	0.014
Pleasant Hill	2	ROW 1583	ROW Opportunity	0.88	0.41	47%	0.005	0.014

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Pleasant Hill	2	planned 144	Planned Unlined Swale	13.98	6.95	50%	0.000	0.014
Pleasant Hill	2	planned 145	Planned Unlined Swale	13.97	6.95	50%	0.000	0.014
Pleasant Hill	2	planned 146	Planned Unlined Bioretention	13.97	6.95	50%	0.000	0.014
Pleasant Hill	2	ROW 1578	ROW Opportunity	0.11	0.06	55%	0.028	0.013
Pleasant Hill	2	ROW 21619	ROW Opportunity	0.42	0.30	71%	0.009	0.013
Pleasant Hill	2	ROW 9265	ROW Opportunity	3.88	1.63	42%	0.001	0.013
Pleasant Hill	2	ROW 9827	ROW Opportunity	0.83	0.55	66%	0.005	0.013
Pleasant Hill	2	ROW 16415	ROW Opportunity	6.78	2.96	44%	0.001	0.012
Pleasant Hill	2	ROW 19765	ROW Opportunity	5.47	2.26	41%	0.001	0.012
Pleasant Hill	2	ROW 20458	ROW Opportunity	1.53	0.73	48%	0.003	0.012
Pleasant Hill	2	ROW 20779	ROW Opportunity	1.73	0.65	38%	0.002	0.012
Pleasant Hill	2	ROW 6601	ROW Opportunity	2.26	1.12	50%	0.002	0.012
Pleasant Hill	2	Parcel 160193	Parcel-Based Opportunity	7.87	2.98	38%	0.001	0.012
Pleasant Hill	2	ROW 20849	ROW Opportunity	6.60	2.63	40%	0.001	0.011
Pleasant Hill	2	ROW 4526	ROW Opportunity	1.86	0.90	48%	0.002	0.011
Pleasant Hill	2	ROW 5980	ROW Opportunity	2.92	1.23	42%	0.002	0.011
Pleasant Hill	2	ROW 6634	ROW Opportunity	6.62	2.81	42%	0.001	0.011
Pleasant Hill	2	Parcel 156885	Regional Opportunity	1.48	0.76	51%	0.003	0.011
Pleasant Hill	2	Parcel 140820	Parcel-Based Opportunity	6.41	2.61	41%	0.001	0.011
Pleasant Hill	2	ROW 1108	ROW Opportunity	6.39	2.49	39%	0.001	0.010
Pleasant Hill	2	ROW 18658	ROW Opportunity	4.86	2.26	47%	0.001	0.010
Pleasant Hill	2	ROW 4523	ROW Opportunity	0.73	0.35	48%	0.004	0.010
Pleasant Hill	2	ROW 5248	ROW Opportunity	3.52	1.52	43%	0.001	0.010
Pleasant Hill	2	Parcel 176573	Parcel-Based Opportunity	4.87	2.62	54%	0.001	0.010
Pleasant Hill	2	Parcel 165486	Parcel-Based Opportunity	11.72	2.14	18%	0.000	0.010
Pleasant Hill	2	Parcel 182562	Parcel-Based Opportunity	5.49	2.50	46%	0.001	0.010
Richmond	2	ROW 20822	ROW Opportunity	39.83	15.26	38%	0.035	5.536
Richmond	2	Parcel 129049	Parcel-Based Opportunity	22.09	16.69	76%	0.043	3.838
Richmond	2	Parcel 127810	Parcel-Based Opportunity	42.57	8.26	19%	0.018	3.037
Richmond	2	ROW 3504	ROW Opportunity	23.46	15.79	67%	0.030	2.744
Richmond	2	ROW 7696	ROW Opportunity	16.17	10.80	67%	0.034	2.163
Richmond	2	Parcel 123788	Parcel-Based Opportunity	11.85	7.18	61%	0.042	1.971
Richmond	2	Parcel 120807	Parcel-Based Opportunity	9.67	6.99	72%	0.049	1.882
Richmond	2	Parcel 124519	Parcel-Based Opportunity	19.03	5.78	30%	0.024	1.772
Richmond	2	GIP 00492 / ROW 8576	ROW Opportunity (aspirational)	15.12	9.82	65%	0.028	1.643
Richmond	2	GIP 00339 / planned 485	Parcel-Based Opportunity (aspirational)	17.80	11.62	65%	0.022	1.526
Richmond	2	ROW 11830	ROW Opportunity	12.26	7.59	62%	0.029	1.377
Richmond	2	GIP 00340 / planned 175	Parcel-Based Opportunity (aspirational)	12.22	6.77	55%	0.026	1.248
Richmond	2	planned 499	Planned Creek/Marsh Restoration	14.17	5.11	36%	0.022	1.243
Richmond	2	Parcel 128990	Parcel-Based Opportunity	6.86	5.17	75%	0.043	1.191
Richmond	2	Parcel 125155	Parcel-Based Opportunity	6.08	4.04	66%	0.047	1.137
Richmond	2	Parcel 163241	Parcel-Based Opportunity	7.34	4.87	66%	0.038	1.127
Richmond	2	ROW 13188	ROW Opportunity	10.46	6.45	62%	0.026	1.046
Richmond	2	GIP 00338 / planned 469	Parcel-Based Opportunity (aspirational)	7.99	4.10	51%	0.030	0.967
Richmond	2	ROW 7811	ROW Opportunity	7.27	4.20	58%	0.031	0.908
Richmond	2	ROW 21445	ROW Opportunity	6.74	4.73	70%	0.034	0.902
Richmond	2	ROW 20428	ROW Opportunity	8.97	5.45	61%	0.026	0.897
Richmond	2	ROW 16598	ROW Opportunity	5.68	3.88	68%	0.038	0.858
Richmond	2	ROW 13906	ROW Opportunity	10.89	7.33	67%	0.021	0.852
Richmond	2	ROW 20478	ROW Opportunity	5.90	3.53	60%	0.035	0.838
Richmond	2	ROW 15751	ROW Opportunity	5.55	3.33	60%	0.037	0.817
Richmond	2	ROW 2597	ROW Opportunity	6.82	3.55	52%	0.030	0.815
Richmond	2	ROW 12288	ROW Opportunity	4.84	3.24	67%	0.039	0.758
Richmond	2	Parcel 170010	Parcel-Based Opportunity	4.52	3.14	69%	0.041	0.737
Richmond	2	ROW 10536	ROW Opportunity	4.37	2.57	59%	0.042	0.735
Richmond	2	Parcel 113348	Parcel-Based Opportunity	6.69	1.91	29%	0.028	0.694
Richmond	2	ROW 11839	ROW Opportunity	4.37	2.51	57%	0.039	0.691
Richmond	2	ROW 3732	ROW Opportunity	5.46	4.24	78%	0.032	0.685
Richmond	2	ROW 16560	ROW Opportunity	3.78	2.59	69%	0.044	0.672
Richmond	2	ROW 6855	ROW Opportunity	3.69	2.65	72%	0.041	0.607
Richmond	2	ROW 8567	ROW Opportunity	3.74	2.04	55%	0.040	0.601
Richmond	2	ROW 14144	ROW Opportunity	3.21	2.59	81%	0.045	0.587
Richmond	2	ROW 11498	ROW Opportunity	21.21	14.65	69%	0.008	0.577
Richmond	2	ROW 3742	ROW Opportunity	3.63	2.47	68%	0.039	0.577
Richmond	2	GIP 00482 / ROW 5241	ROW Opportunity (aspirational)	21.59	14.60	68%	0.008	0.574
Richmond	2	ROW 18209	ROW Opportunity	3.51	2.46	70%	0.040	0.567
Richmond	2	ROW 15876	ROW Opportunity	5.16	2.25	44%	0.027	0.566
Richmond	2	ROW 17007	ROW Opportunity	3.15	1.90	60%	0.043	0.546
Richmond	2	ROW 8889	ROW Opportunity	7.45	5.28	71%	0.020	0.542
Richmond	2	Parcel 118976	Parcel-Based Opportunity	7.69	1.60	21%	0.017	0.536
Richmond	2	ROW 20886	ROW Opportunity	2.41	1.89	78%	0.053	0.513
Richmond	2	ROW 15749	ROW Opportunity	4.75	2.94	62%	0.027	0.506
Richmond	2	ROW 16532	ROW Opportunity	3.19	2.11	66%	0.039	0.499
Richmond	2	ROW 7809	ROW Opportunity	11.56	3.25	28%	0.011	0.495
Richmond	2	Parcel 114973	Regional Opportunity	2.84	1.61	57%	0.042	0.471
Richmond	2	ROW 18134	ROW Opportunity	3.07	1.56	51%	0.038	0.468
Richmond	2	ROW 8456	ROW Opportunity	2.87	1.60	56%	0.040	0.458
Richmond	2	ROW 17719	ROW Opportunity	2.63	1.56	59%	0.042	0.446
Richmond	2	ROW 15166	ROW Opportunity	2.88	1.95	68%	0.038	0.445
Richmond	2	ROW 6827	ROW Opportunity	2.89	2.10	73%	0.037	0.429
Richmond	2	ROW 12287	ROW Opportunity	2.82	1.98	70%	0.038	0.424
Richmond	2	ROW 1670	ROW Opportunity	19.48	13.28	68%	0.007	0.422
Richmond	2	ROW 14670	ROW Opportunity	3.12	1.33	43%	0.033	0.411
Richmond	2	Parcel 159148	Regional Opportunity	2.48	1.76	71%	0.041	0.407
Richmond	2	ROW 6275	ROW Opportunity	3.46	1.24	36%	0.029	0.402
Richmond	2	ROW 1342	ROW Opportunity	12.99	5.89	45%	0.009	0.401
Richmond	2	ROW 16455	ROW Opportunity	2.53	1.71	68%	0.038	0.384
Richmond	2	GIP 00357 / Parcel 152787	Regional Opportunity (aspirational)	2.53	1.64	65%	0.037	0.380
Richmond	2	ROW 4530	ROW Opportunity	3.12	1.81	58%	0.030	0.380
Richmond	2	Parcel 171579	Parcel-Based Opportunity	3.65	2.87	79%	0.027	0.380
Richmond	2	ROW 4590	ROW Opportunity	2.11	1.33	63%	0.044	0.377
Richmond	2	ROW 20441	ROW Opportunity	5.49	3.04	55%	0.018	0.374
Richmond	2	GIP 00335 / planned 491	Parcel-Based Opportunity (aspirational)	3.12	1.99	64%	0.030	0.369
Richmond	2	ROW 16485	ROW Opportunity	2.63	1.92	73%	0.035	0.369

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Richmond	2	ROW 11379	ROW Opportunity	2.04	1.65	81%	0.045	0.368
Richmond	2	ROW 15485	ROW Opportunity	2.06	1.37	67%	0.044	0.363
Richmond	2	ROW 355	ROW Opportunity	2.64	1.88	71%	0.034	0.354
Richmond	2	ROW 3738	ROW Opportunity	2.58	1.82	71%	0.034	0.346
Richmond	2	Parcel 114963	Parcel-Based Opportunity	4.22	1.02	24%	0.021	0.345
Richmond	2	ROW 1767	ROW Opportunity	1.96	1.18	60%	0.044	0.343
Richmond	2	Parcel 153008	Parcel-Based Opportunity	10.59	7.84	74%	0.010	0.340
Richmond	2	Parcel 126231	Regional Opportunity	1.65	1.47	89%	0.050	0.334
Richmond	2	ROW 14678	ROW Opportunity	6.63	4.45	67%	0.014	0.333
Richmond	2	ROW 15193	ROW Opportunity	6.84	4.72	69%	0.014	0.333
Richmond	2	ROW 15752	ROW Opportunity	2.85	1.93	68%	0.029	0.328
Richmond	2	ROW 16472	ROW Opportunity	2.17	1.54	71%	0.037	0.324
Richmond	2	ROW 15877	ROW Opportunity	4.92	2.81	57%	0.017	0.323
Richmond	2	ROW 9595	ROW Opportunity	2.77	2.08	75%	0.029	0.312
Richmond	2	ROW 3292	ROW Opportunity	2.05	1.67	81%	0.038	0.305
Richmond	2	ROW 3744	ROW Opportunity	3.85	2.44	63%	0.020	0.299
Richmond	2	planned 487	Planned Unlined Bioretention	22.60	15.02	66%	0.005	0.296
Richmond	2	ROW 17305	ROW Opportunity	1.92	0.98	51%	0.038	0.294
Richmond	2	planned 496	Planned Creek/Marsh Restoration	3.90	2.25	58%	0.020	0.294
Richmond	2	GIP 00336 /planned 479	Parcel-Based Opportunity (aspirational)	12.83	8.77	68%	0.007	0.291
Richmond	2	ROW 333	ROW Opportunity	9.12	6.07	67%	0.009	0.290
Richmond	2	ROW 3883	ROW Opportunity	8.72	5.79	66%	0.010	0.282
Richmond	2	ROW 6859	ROW Opportunity	2.12	0.59	28%	0.033	0.279
Richmond	2	ROW 9722	ROW Opportunity	1.69	1.17	69%	0.041	0.276
Richmond	2	ROW 16528	ROW Opportunity	2.22	1.27	57%	0.031	0.274
Richmond	2	Parcel 115416	Regional Opportunity	1.53	0.93	61%	0.044	0.270
Richmond	2	ROW 17316	ROW Opportunity	1.73	0.90	52%	0.039	0.268
Richmond	2	ROW 12193	ROW Opportunity	5.91	4.11	70%	0.013	0.264
Richmond	2	ROW 7332	ROW Opportunity	1.62	1.25	77%	0.041	0.263
Richmond	2	ROW 11831	ROW Opportunity	1.49	1.14	77%	0.044	0.262
Richmond	2	ROW 6828	ROW Opportunity	1.71	1.18	69%	0.038	0.261
Richmond	2	Parcel 167791	Parcel-Based Opportunity	3.42	2.71	79%	0.020	0.261
Richmond	2	ROW 12952	ROW Opportunity	3.16	1.44	46%	0.021	0.259
Richmond	2	ROW 12328	ROW Opportunity	2.62	0.81	31%	0.024	0.258
Richmond	2	ROW 14807	ROW Opportunity	2.63	1.88	71%	0.026	0.255
Richmond	2	ROW 156	ROW Opportunity	4.72	3.23	68%	0.015	0.255
Richmond	2	ROW 13420	ROW Opportunity	5.29	3.71	70%	0.013	0.252
Richmond	2	ROW 6274	ROW Opportunity	4.20	2.48	59%	0.016	0.252
Richmond	2	ROW 16487	ROW Opportunity	1.47	1.09	74%	0.042	0.249
Richmond	2	ROW 9163	ROW Opportunity	3.60	2.25	63%	0.018	0.245
Richmond	2	planned 495	Planned Water Quality Basin	1.91	1.10	58%	0.032	0.242
Richmond	2	ROW 15892	ROW Opportunity	14.20	7.48	53%	0.005	0.239
Richmond	2	ROW 1795	ROW Opportunity	1.37	1.03	75%	0.044	0.239
Richmond	2	ROW 18184	ROW Opportunity	1.61	0.80	50%	0.037	0.238
Richmond	2	Parcel 116238	Parcel-Based Opportunity	1.29	0.82	64%	0.045	0.234
Richmond	2	ROW 11883	ROW Opportunity	1.42	0.98	69%	0.041	0.231
Richmond	2	planned 497	Planned Creek/Marsh Restoration	1.59	0.97	61%	0.036	0.230
Richmond	2	ROW 1792	ROW Opportunity	1.33	0.97	73%	0.043	0.226
Richmond	2	ROW 6971	ROW Opportunity	1.62	1.15	71%	0.035	0.224
Richmond	2	ROW 18110	ROW Opportunity	2.22	1.56	70%	0.026	0.223
Richmond	2	ROW 16442	ROW Opportunity	3.16	0.67	21%	0.017	0.220
Richmond	2	ROW 18395	ROW Opportunity	2.05	0.89	43%	0.026	0.213
Richmond	2	ROW 16535	ROW Opportunity	2.13	1.38	65%	0.025	0.211
Richmond	2	ROW 15167	ROW Opportunity	1.76	1.21	69%	0.030	0.211
Richmond	2	ROW 16436	ROW Opportunity	1.97	1.36	69%	0.027	0.211
Richmond	2	ROW 16488	ROW Opportunity	1.32	0.96	73%	0.039	0.209
Richmond	2	Parcel 110613	Regional Opportunity	1.25	0.72	58%	0.041	0.209
Richmond	2	ROW 17259	ROW Opportunity	1.63	0.69	42%	0.032	0.207
Richmond	2	ROW 15285	ROW Opportunity	1.06	0.71	67%	0.048	0.205
Richmond	2	ROW 1765	ROW Opportunity	1.21	0.71	59%	0.042	0.204
Richmond	2	ROW 863	ROW Opportunity	1.39	0.86	62%	0.036	0.204
Richmond	2	ROW 16441	ROW Opportunity	2.29	1.59	69%	0.023	0.202
Richmond	2	planned 531	Planned Water Quality Basin	75.78	38.92	51%	0.001	0.202
Richmond	2	ROW 5443	ROW Opportunity	1.01	0.88	87%	0.049	0.200
Richmond	2	ROW 4125	ROW Opportunity	2.29	1.49	65%	0.022	0.197
Richmond	2	Parcel 111210	Regional Opportunity	1.27	0.90	71%	0.040	0.197
Richmond	2	ROW 6857	ROW Opportunity	1.59	0.64	40%	0.031	0.196
Richmond	2	ROW 1468	ROW Opportunity	2.21	1.56	71%	0.023	0.196
Richmond	2	ROW 13349	ROW Opportunity	1.13	0.84	74%	0.043	0.195
Richmond	2	ROW 14518	ROW Opportunity	1.76	1.15	65%	0.028	0.195
Richmond	2	ROW 1731	ROW Opportunity	1.11	0.83	75%	0.043	0.193
Richmond	2	ROW 3731	ROW Opportunity	1.22	0.82	67%	0.040	0.191
Richmond	2	Parcel 162407	Regional Opportunity	1.21	0.82	68%	0.039	0.190
Richmond	2	ROW 289	ROW Opportunity	1.43	0.78	55%	0.033	0.188
Richmond	2	ROW 1770	ROW Opportunity	8.43	5.33	63%	0.007	0.187
Richmond	2	ROW 15757	ROW Opportunity	1.18	0.64	54%	0.039	0.186
Richmond	2	GIP 00295 /planned 534	Parcel-Based Opportunity (aspirational)	2.20	1.33	60%	0.022	0.183
Richmond	2	ROW 318	ROW Opportunity	2.13	1.41	66%	0.022	0.183
Richmond	2	ROW 11890	ROW Opportunity	0.99	0.79	80%	0.046	0.181
Richmond	2	Parcel 134412	Parcel-Based Opportunity	4.34	3.50	81%	0.012	0.181
Richmond	2	Parcel 198059	Parcel-Based Opportunity	6.65	3.60	54%	0.008	0.180
Richmond	2	ROW 17324	ROW Opportunity	1.23	0.80	65%	0.036	0.178
Richmond	2	ROW 2766	ROW Opportunity	1.36	0.86	63%	0.032	0.174
Richmond	2	Parcel 166327	Regional Opportunity	2.29	1.75	76%	0.020	0.174
Richmond	2	ROW 16520	ROW Opportunity	1.38	0.79	57%	0.031	0.171
Richmond	2	ROW 16913	ROW Opportunity	16.07	8.93	56%	0.004	0.171
Richmond	2	ROW 15468	ROW Opportunity	1.02	0.75	74%	0.042	0.170
Richmond	2	ROW 17298	ROW Opportunity	0.91	0.59	65%	0.046	0.169
Richmond	2	ROW 161	ROW Opportunity	1.86	1.31	70%	0.024	0.169
Richmond	2	Parcel 169252	Regional Opportunity	1.01	0.72	71%	0.042	0.169
Richmond	2	ROW 1749	ROW Opportunity	0.97	0.72	74%	0.044	0.168
Richmond	2	ROW 16840	ROW Opportunity	6.87	4.81	70%	0.008	0.166
Richmond	2	ROW 14810	ROW Opportunity	0.89	0.58	65%	0.046	0.165
Richmond	2	ROW 70	ROW Opportunity	3.96	2.77	70%	0.012	0.165

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Richmond	2	ROW 20040	ROW Opportunity	2.45	1.53	62%	0.018	0.164
Richmond	2	ROW 21242	ROW Opportunity	1.27	0.83	65%	0.032	0.160
Richmond	2	Parcel 238663	Parcel-Based Opportunity	50.69	7.21	14%	0.001	0.157
Richmond	2	Parcel 169551	Parcel-Based Opportunity	3.47	2.76	80%	0.013	0.157
Richmond	2	ROW 3740	ROW Opportunity	1.92	1.15	60%	0.021	0.156
Richmond	2	ROW 16482	ROW Opportunity	1.10	0.73	66%	0.035	0.154
Richmond	2	Parcel 120883	Regional Opportunity	0.95	0.54	57%	0.040	0.154
Richmond	2	ROW 9124	ROW Opportunity	8.76	4.50	51%	0.006	0.153
Richmond	2	ROW 16456	ROW Opportunity	1.03	0.65	63%	0.037	0.151
Richmond	2	ROW 7328	ROW Opportunity	7.44	4.86	65%	0.006	0.149
Richmond	2	ROW 176	ROW Opportunity	0.99	0.68	69%	0.037	0.147
Richmond	2	Parcel 112907	Regional Opportunity	2.04	0.43	21%	0.018	0.147
Richmond	2	ROW 16976	ROW Opportunity	0.83	0.62	75%	0.044	0.145
Richmond	2	Parcel 193343	Parcel-Based Opportunity	0.62	0.27	44%	0.058	0.145
Richmond	2	ROW 20689	ROW Opportunity	0.90	0.49	54%	0.040	0.143
Richmond	2	planned 527	Planned Unlined Bioretention	4.44	3.26	73%	0.010	0.143
Richmond	2	ROW 16452	ROW Opportunity	0.92	0.62	67%	0.038	0.142
Richmond	2	ROW 1766	ROW Opportunity	0.85	0.49	58%	0.041	0.141
Richmond	2	ROW 3022	ROW Opportunity	1.28	0.85	66%	0.028	0.141
Richmond	2	ROW 173	ROW Opportunity	2.06	1.39	67%	0.018	0.140
Richmond	2	ROW 233	ROW Opportunity	4.88	3.24	66%	0.009	0.139
Richmond	2	ROW 344	ROW Opportunity	3.21	2.36	74%	0.012	0.139
Richmond	2	ROW 6305	ROW Opportunity	0.95	0.58	61%	0.036	0.138
Richmond	2	ROW 2543	ROW Opportunity	0.87	0.46	53%	0.039	0.137
Richmond	2	Parcel 144553	Parcel-Based Opportunity	4.24	3.16	75%	0.010	0.137
Richmond	2	planned 484	Planned Unlined Bioretention	3.36	2.28	68%	0.011	0.136
Richmond	2	ROW 20415	ROW Opportunity	1.09	0.78	72%	0.031	0.135
Richmond	2	ROW 11849	ROW Opportunity	4.83	3.30	68%	0.008	0.134
Richmond	2	GIP 00322 / planned 535	Parcel-Based Opportunity (aspirational)	4.59	3.21	70%	0.009	0.133
Richmond	2	ROW 10967	ROW Opportunity	0.87	0.44	51%	0.038	0.133
Richmond	2	ROW 17276	ROW Opportunity	0.72	0.47	65%	0.046	0.133
Richmond	2	Parcel 225180	Parcel-Based Opportunity	4.05	3.00	74%	0.010	0.133
Richmond	2	ROW 3965	ROW Opportunity	0.72	0.47	65%	0.046	0.132
Richmond	2	ROW 16559	ROW Opportunity	0.85	0.56	66%	0.038	0.129
Richmond	2	Parcel 172178	Parcel-Based Opportunity	3.68	2.88	78%	0.010	0.129
Richmond	2	ROW 7673	ROW Opportunity	1.89	0.92	49%	0.018	0.128
Richmond	2	ROW 9823	ROW Opportunity	0.70	0.54	77%	0.045	0.126
Richmond	2	ROW 17258	ROW Opportunity	0.77	0.43	56%	0.040	0.125
Richmond	2	ROW 16531	ROW Opportunity	3.40	2.29	67%	0.011	0.125
Richmond	2	ROW 20486	ROW Opportunity	4.18	2.56	61%	0.009	0.124
Richmond	2	ROW 17037	ROW Opportunity	4.87	3.10	64%	0.008	0.123
Richmond	2	ROW 3505	ROW Opportunity	0.88	0.62	70%	0.035	0.123
Richmond	2	Parcel 155701	Regional Opportunity	0.77	0.53	69%	0.039	0.123
Richmond	2	ROW 12830	ROW Opportunity	1.15	0.73	63%	0.027	0.121
Richmond	2	ROW 74	ROW Opportunity	2.79	1.80	65%	0.012	0.120
Richmond	2	ROW 16434	ROW Opportunity	1.25	0.88	70%	0.025	0.119
Richmond	2	ROW 6803	ROW Opportunity	1.00	0.69	69%	0.030	0.119
Richmond	2	ROW 226	ROW Opportunity	3.03	2.02	67%	0.011	0.117
Richmond	2	ROW 15830	ROW Opportunity	8.70	6.19	71%	0.005	0.115
Richmond	2	ROW 17301	ROW Opportunity	0.65	0.48	74%	0.043	0.112
Richmond	2	ROW 15989	ROW Opportunity	4.07	2.72	67%	0.008	0.112
Richmond	2	ROW 291	ROW Opportunity	0.71	0.46	65%	0.038	0.110
Richmond	2	ROW 168	ROW Opportunity	5.27	3.69	70%	0.007	0.110
Richmond	2	ROW 11622	ROW Opportunity	7.40	4.72	64%	0.005	0.109
Richmond	2	Parcel 125476	Regional Opportunity	0.74	0.37	50%	0.036	0.108
Richmond	2	ROW 11840	ROW Opportunity	0.65	0.37	57%	0.041	0.107
Richmond	2	ROW 15750	ROW Opportunity	1.48	0.80	54%	0.019	0.107
Richmond	2	ROW 4528	ROW Opportunity	1.18	0.55	47%	0.023	0.107
Richmond	2	ROW 4784	ROW Opportunity	0.68	0.50	74%	0.040	0.107
Richmond	2	ROW 16464	ROW Opportunity	3.55	2.42	68%	0.009	0.106
Richmond	2	Parcel 196459	Parcel-Based Opportunity	0.43	0.19	44%	0.058	0.101
Richmond	2	ROW 10962	ROW Opportunity	0.54	0.35	65%	0.045	0.100
Richmond	2	ROW 17311	ROW Opportunity	0.62	0.43	69%	0.040	0.100
Richmond	2	ROW 6267	ROW Opportunity	0.66	0.42	64%	0.037	0.100
Richmond	2	ROW 15881	ROW Opportunity	11.64	6.16	53%	0.003	0.097
Richmond	2	ROW 1732	ROW Opportunity	0.52	0.33	63%	0.046	0.096
Richmond	2	ROW 11062	ROW Opportunity	2.50	1.26	50%	0.011	0.096
Richmond	2	ROW 15232	ROW Opportunity	0.63	0.46	73%	0.038	0.095
Richmond	2	ROW 8095	ROW Opportunity	5.10	2.61	51%	0.006	0.095
Richmond	2	planned 463	Planned Unlined Bioretention	3.35	2.09	62%	0.008	0.095
Richmond	2	Parcel 212172	Parcel-Based Opportunity	3.35	2.09	62%	0.008	0.095
Richmond	2	Parcel 163884	Regional Opportunity	0.60	0.41	68%	0.039	0.095
Richmond	2	Parcel 129221	Regional Opportunity	0.56	0.33	59%	0.042	0.095
Richmond	2	ROW 3104	ROW Opportunity	0.60	0.46	77%	0.039	0.094
Richmond	2	ROW 5507	ROW Opportunity	0.52	0.32	62%	0.045	0.094
Richmond	2	GIP 00367 / Parcel 144341	Regional Opportunity (aspirational)	2.87	2.15	75%	0.010	0.093
Richmond	2	ROW 9164	ROW Opportunity	0.62	0.40	65%	0.037	0.093
Richmond	2	ROW 17006	ROW Opportunity	1.13	0.60	53%	0.022	0.092
Richmond	2	ROW 73	ROW Opportunity	0.59	0.40	68%	0.039	0.092
Richmond	2	ROW 11378	ROW Opportunity	3.08	1.99	65%	0.009	0.091
Richmond	2	ROW 16846	ROW Opportunity	0.61	0.44	72%	0.037	0.091
Richmond	2	ROW 187	ROW Opportunity	1.62	1.06	65%	0.015	0.091
Richmond	2	planned 199	Planned Creek/Marsh Restoration	3.43	1.93	56%	0.008	0.091
Richmond	2	ROW 17720	ROW Opportunity	0.53	0.32	60%	0.043	0.090
Richmond	2	ROW 5467	ROW Opportunity	0.76	0.29	38%	0.030	0.090
Richmond	2	ROW 16486	ROW Opportunity	0.67	0.40	60%	0.033	0.088
Richmond	2	ROW 3103	ROW Opportunity	0.47	0.38	81%	0.047	0.088
Richmond	2	ROW 254	ROW Opportunity	7.15	4.85	68%	0.004	0.088
Richmond	2	ROW 16465	ROW Opportunity	0.60	0.44	73%	0.036	0.087
Richmond	2	Parcel 119238	Parcel-Based Opportunity	3.39	1.91	56%	0.008	0.087
Richmond	2	ROW 2596	ROW Opportunity	1.62	1.11	69%	0.015	0.085
Richmond	2	ROW 5180	ROW Opportunity	0.47	0.29	62%	0.045	0.085
Richmond	2	Parcel 170769	Regional Opportunity	2.46	1.96	80%	0.010	0.085
Richmond	2	Parcel 110802	Regional Opportunity	0.82	0.25	30%	0.026	0.085

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Richmond	2	ROW 16552	ROW Opportunity	3.51	2.33	66%	0.007	0.084
Richmond	2	ROW 6721	ROW Opportunity	0.50	0.36	72%	0.041	0.083
Richmond	2	ROW 16445	ROW Opportunity	1.04	0.70	67%	0.021	0.083
Richmond	2	Parcel 155487	Regional Opportunity	3.02	1.80	60%	0.008	0.083
Richmond	2	ROW 21198	ROW Opportunity	0.41	0.29	71%	0.050	0.082
Richmond	2	Parcel 116278	Regional Opportunity	0.91	0.24	26%	0.022	0.082
Richmond	2	Parcel 117353	Regional Opportunity	2.33	0.81	35%	0.010	0.082
Richmond	2	ROW 15197	ROW Opportunity	0.50	0.35	70%	0.040	0.081
Richmond	2	Parcel 119884	Regional Opportunity	0.64	0.27	42%	0.031	0.081
Richmond	2	ROW 116	ROW Opportunity	2.56	1.74	68%	0.009	0.080
Richmond	2	ROW 200	ROW Opportunity	5.74	3.95	69%	0.005	0.080
Richmond	2	ROW 9162	ROW Opportunity	4.57	3.10	68%	0.006	0.080
Richmond	2	Parcel 124307	Regional Opportunity	0.46	0.28	61%	0.043	0.079
Richmond	2	ROW 21073	ROW Opportunity	3.56	2.16	61%	0.007	0.078
Richmond	2	ROW 2162	ROW Opportunity	9.38	6.41	68%	0.003	0.078
Richmond	2	ROW 9937	ROW Opportunity	2.83	1.11	39%	0.008	0.078
Richmond	2	Parcel 165219	Regional Opportunity	1.77	1.40	79%	0.013	0.078
Richmond	2	GIP 00323 / planned 512	Parcel-Based Opportunity (aspirational)	4.34	2.92	67%	0.006	0.077
Richmond	2	ROW 16538	ROW Opportunity	1.07	0.58	54%	0.019	0.077
Richmond	2	ROW 20633	ROW Opportunity	4.94	2.89	59%	0.005	0.077
Richmond	2	ROW 16496	ROW Opportunity	4.37	2.90	66%	0.006	0.076
Richmond	2	ROW 13581	ROW Opportunity	0.59	0.26	44%	0.032	0.075
Richmond	2	ROW 16467	ROW Opportunity	2.66	1.79	67%	0.009	0.075
Richmond	2	Parcel 375479	Parcel-Based Opportunity	68.51	8.98	13%	0.000	0.075
Richmond	2	ROW 10098	ROW Opportunity	6.38	4.15	65%	0.004	0.074
Richmond	2	ROW 1830	ROW Opportunity	1.38	0.93	67%	0.015	0.074
Richmond	2	ROW 82	ROW Opportunity	0.80	0.60	75%	0.024	0.074
Richmond	2	ROW 92	ROW Opportunity	4.38	3.00	68%	0.006	0.073
Richmond	2	ROW 12125	ROW Opportunity	5.50	3.66	67%	0.005	0.072
Richmond	2	ROW 2164	ROW Opportunity	1.27	0.90	71%	0.015	0.070
Richmond	2	Parcel 144098	Regional Opportunity	1.08	0.98	91%	0.018	0.070
Richmond	2	Parcel 115970	Regional Opportunity	0.55	0.12	22%	0.032	0.070
Richmond	2	ROW 16394	ROW Opportunity	0.51	0.23	45%	0.034	0.069
Richmond	2	ROW 16563	ROW Opportunity	4.10	2.78	68%	0.006	0.069
Richmond	2	ROW 16866	ROW Opportunity	3.52	2.37	67%	0.006	0.069
Richmond	2	ROW 7810	ROW Opportunity	0.59	0.27	46%	0.029	0.069
Richmond	2	ROW 16544	ROW Opportunity	4.83	3.31	69%	0.005	0.068
Richmond	2	Parcel 115590	Regional Opportunity	0.98	0.21	21%	0.017	0.068
Richmond	2	Parcel 116661	Regional Opportunity	0.52	0.13	25%	0.033	0.068
Richmond	2	ROW 16480	ROW Opportunity	1.96	1.32	67%	0.010	0.067
Richmond	2	ROW 195	ROW Opportunity	5.26	3.67	70%	0.005	0.067
Richmond	2	ROW 2163	ROW Opportunity	3.05	2.15	70%	0.007	0.066
Richmond	2	ROW 5903	ROW Opportunity	0.39	0.28	72%	0.042	0.066
Richmond	2	ROW 9784	ROW Opportunity	0.50	0.22	44%	0.033	0.066
Richmond	2	ROW 11623	ROW Opportunity	5.63	3.78	67%	0.004	0.066
Richmond	2	ROW 17728	ROW Opportunity	0.42	0.22	52%	0.039	0.065
Richmond	2	Parcel 129781	Parcel-Based Opportunity	0.46	0.22	48%	0.036	0.065
Richmond	2	Parcel 174262	Parcel-Based Opportunity	2.11	1.19	56%	0.009	0.065
Richmond	2	ROW 20751	ROW Opportunity	0.72	0.52	72%	0.023	0.064
Richmond	2	ROW 16504	ROW Opportunity	0.99	0.61	62%	0.017	0.064
Richmond	2	ROW 8571	ROW Opportunity	3.24	2.28	70%	0.006	0.064
Richmond	2	GIP 00456 / ROW 16561	ROW Opportunity (aspirational)	4.64	3.09	67%	0.005	0.063
Richmond	2	ROW 17527	ROW Opportunity	9.09	4.79	53%	0.003	0.063
Richmond	2	Parcel 117968	Regional Opportunity	0.56	0.24	43%	0.028	0.063
Richmond	2	ROW 21231	ROW Opportunity	0.41	0.21	51%	0.037	0.062
Richmond	2	ROW 147	ROW Opportunity	0.82	0.56	68%	0.020	0.062
Richmond	2	GIP 00345 / planned 138	Parcel-Based Opportunity (aspirational)	39.35	14.16	36%	0.001	0.061
Richmond	2	ROW 1763	ROW Opportunity	0.34	0.21	62%	0.044	0.061
Richmond	2	ROW 3733	ROW Opportunity	0.47	0.25	53%	0.032	0.061
Richmond	2	ROW 105	ROW Opportunity	2.41	1.61	67%	0.008	0.061
Richmond	2	ROW 6864	ROW Opportunity	0.36	0.26	72%	0.042	0.061
Richmond	2	planned 174	Planned Unlined Swale	0.69	0.47	68%	0.023	0.061
Richmond	2	Parcel 154186	Parcel-Based Opportunity	0.39	0.26	67%	0.039	0.061
Richmond	2	ROW 15878	ROW Opportunity	3.44	1.96	57%	0.006	0.060
Richmond	2	ROW 19023	ROW Opportunity	1.43	0.96	67%	0.012	0.060
Richmond	2	ROW 9166	ROW Opportunity	0.45	0.28	62%	0.033	0.060
Richmond	2	ROW 15195	ROW Opportunity	6.51	4.28	66%	0.003	0.059
Richmond	2	ROW 18037	ROW Opportunity	4.29	2.74	64%	0.005	0.059
Richmond	2	ROW 2697	ROW Opportunity	2.39	1.65	69%	0.008	0.059
Richmond	2	Parcel 118569	Parcel-Based Opportunity	0.46	0.19	41%	0.031	0.059
Richmond	2	ROW 1794	ROW Opportunity	0.32	0.25	78%	0.046	0.058
Richmond	2	ROW 20453	ROW Opportunity	0.55	0.39	71%	0.027	0.058
Richmond	2	ROW 19952	ROW Opportunity	0.87	0.59	68%	0.018	0.058
Richmond	2	ROW 16116	ROW Opportunity	0.32	0.20	63%	0.044	0.057
Richmond	2	ROW 16539	ROW Opportunity	1.03	0.59	57%	0.015	0.057
Richmond	2	ROW 886	ROW Opportunity	9.50	6.34	67%	0.003	0.057
Richmond	2	Parcel 133667	Parcel-Based Opportunity	25.54	14.75	58%	0.001	0.057
Richmond	2	Parcel 116468	Parcel-Based Opportunity	0.74	0.29	39%	0.019	0.057
Richmond	2	ROW 4147	ROW Opportunity	0.75	0.48	64%	0.020	0.056
Richmond	2	ROW 16475	ROW Opportunity	2.52	1.67	66%	0.007	0.056
Richmond	2	ROW 9755	ROW Opportunity	0.36	0.24	67%	0.038	0.056
Richmond	2	ROW 17721	ROW Opportunity	0.32	0.19	59%	0.044	0.055
Richmond	2	ROW 3294	ROW Opportunity	0.50	0.34	68%	0.029	0.055
Richmond	2	ROW 18476	ROW Opportunity	1.55	1.08	70%	0.010	0.054
Richmond	2	ROW 13891	ROW Opportunity	0.41	0.18	44%	0.032	0.053
Richmond	2	Parcel 150073	Regional Opportunity	1.80	1.20	67%	0.009	0.053
Richmond	2	ROW 18074	ROW Opportunity	3.67	2.41	66%	0.005	0.052
Richmond	2	Parcel 176154	Parcel-Based Opportunity	27.12	13.35	49%	0.001	0.052
Richmond	2	ROW 18477	ROW Opportunity	2.41	1.65	68%	0.007	0.051
Richmond	2	ROW 9129	ROW Opportunity	3.29	1.38	42%	0.005	0.051
Richmond	2	Parcel 236849	Parcel-Based Opportunity	260.54	3.37	1%	0.000	0.051
Richmond	2	Parcel 118639	Parcel-Based Opportunity	0.45	0.10	22%	0.028	0.050
Richmond	2	ROW 21154	ROW Opportunity	2.44	1.79	73%	0.007	0.049
Richmond	2	ROW 13905	ROW Opportunity	3.58	2.15	60%	0.005	0.049



Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Richmond	2	Parcel 150614	Regional Opportunity	2.05	1.74	85%	0.008	0.049
Richmond	2	ROW 11838	ROW Opportunity	0.29	0.17	59%	0.041	0.048
Richmond	2	ROW 3859	ROW Opportunity	7.00	4.53	65%	0.003	0.048
Richmond	2	ROW 20475	ROW Opportunity	1.12	0.76	68%	0.012	0.047
Richmond	2	ROW 9125	ROW Opportunity	2.59	0.93	36%	0.005	0.047
Richmond	2	ROW 98	ROW Opportunity	2.55	1.75	69%	0.006	0.047
Richmond	2	Parcel 255238	Parcel-Based Opportunity	611.35	20.49	3%	0.000	0.047
Richmond	2	ROW 15754	ROW Opportunity	0.35	0.22	63%	0.033	0.046
Richmond	2	ROW 16440	ROW Opportunity	0.58	0.41	71%	0.021	0.046
Richmond	2	ROW 16512	ROW Opportunity	1.89	1.24	66%	0.008	0.046
Richmond	2	ROW 3979	ROW Opportunity	11.15	7.70	69%	0.002	0.046
Richmond	2	ROW 3728	ROW Opportunity	0.28	0.19	68%	0.040	0.045
Richmond	2	ROW 7216	ROW Opportunity	2.32	1.56	67%	0.006	0.045
Richmond	2	ROW 5190	ROW Opportunity	0.35	0.14	40%	0.031	0.044
Richmond	2	ROW 9939	ROW Opportunity	0.37	0.14	38%	0.029	0.044
Richmond	2	ROW 14433	ROW Opportunity	1.36	0.88	65%	0.010	0.044
Richmond	2	ROW 247	ROW Opportunity	13.62	8.74	64%	0.002	0.044
Richmond	2	ROW 785	ROW Opportunity	6.19	3.83	62%	0.003	0.044
Richmond	2	planned 326	Planned Creek/Marsh Restoration	2.22	0.57	26%	0.006	0.044
Richmond	2	Parcel 132474	Regional Opportunity	1.13	0.87	77%	0.011	0.044
Richmond	2	Parcel 149687	Regional Opportunity	1.43	1.00	70%	0.009	0.044
Richmond	2	GIP 00377 / Parcel 133196	Regional Opportunity (aspirational)	1.20	1.00	83%	0.011	0.043
Richmond	2	ROW 17312	ROW Opportunity	0.27	0.14	52%	0.040	0.043
Richmond	2	ROW 8642	ROW Opportunity	3.74	2.42	65%	0.004	0.043
Richmond	2	planned 296	Planned Creek/Marsh Restoration	83.80	11.53	14%	0.000	0.043
Richmond	2	GIP 00429 / Parcel 143826	Regional Opportunity (aspirational)	1.04	0.89	86%	0.012	0.042
Richmond	2	GIP 00480 / ROW 3507	ROW Opportunity (aspirational)	9.06	5.66	62%	0.002	0.042
Richmond	2	ROW 16211	ROW Opportunity	8.14	5.41	66%	0.002	0.042
Richmond	2	ROW 13417	ROW Opportunity	5.44	3.72	68%	0.003	0.042
Richmond	2	ROW 175	ROW Opportunity	3.50	2.49	71%	0.004	0.042
Richmond	2	Parcel 188482	Parcel-Based Opportunity	7.05	3.25	46%	0.002	0.042
Richmond	2	ROW 16208	ROW Opportunity	2.13	1.44	68%	0.006	0.041
Richmond	2	ROW 16555	ROW Opportunity	3.26	2.17	67%	0.004	0.041
Richmond	2	Parcel 211565	Regional Opportunity	1.57	0.88	56%	0.008	0.041
Richmond	2	Parcel 149904	Regional Opportunity	1.45	0.91	63%	0.008	0.041
Richmond	2	Parcel 166751	Regional Opportunity	1.09	0.95	87%	0.011	0.041
Richmond	2	Parcel 113228	Parcel-Based Opportunity	0.23	0.14	61%	0.044	0.041
Richmond	2	GIP 00372 / Parcel 152927	Regional Opportunity (aspirational)	3.09	1.99	64%	0.005	0.040
Richmond	2	ROW 100	ROW Opportunity	3.68	2.57	70%	0.004	0.040
Richmond	2	ROW 10892	ROW Opportunity	0.90	0.53	59%	0.012	0.040
Richmond	2	ROW 14676	ROW Opportunity	1.05	0.73	70%	0.011	0.040
Richmond	2	ROW 2159	ROW Opportunity	3.17	2.21	70%	0.004	0.040
Richmond	2	ROW 245	ROW Opportunity	12.24	7.96	65%	0.002	0.040
Richmond	2	ROW 273	ROW Opportunity	9.08	6.04	67%	0.002	0.040
Richmond	2	ROW 66	ROW Opportunity	1.53	1.13	74%	0.008	0.040
Richmond	2	Parcel 139167	Regional Opportunity	0.87	0.70	80%	0.013	0.040
Richmond	2	ROW 16507	ROW Opportunity	1.11	0.73	66%	0.010	0.039
Richmond	2	ROW 248	ROW Opportunity	6.87	4.50	66%	0.002	0.039
Richmond	2	Parcel 116652	Parcel-Based Opportunity	0.23	0.13	57%	0.042	0.039
Richmond	2	ROW 126	ROW Opportunity	1.73	1.12	65%	0.007	0.038
Richmond	2	ROW 11363	ROW Opportunity	9.37	6.08	65%	0.002	0.038
Richmond	2	ROW 15753	ROW Opportunity	0.77	0.46	60%	0.014	0.038
Richmond	2	ROW 16503	ROW Opportunity	2.40	1.57	65%	0.005	0.038
Richmond	2	ROW 16557	ROW Opportunity	3.91	2.61	67%	0.004	0.038
Richmond	2	ROW 212	ROW Opportunity	7.21	4.69	65%	0.002	0.038
Richmond	2	ROW 257	ROW Opportunity	9.16	6.03	66%	0.002	0.038
Richmond	2	ROW 69	ROW Opportunity	1.85	1.26	68%	0.007	0.038
Richmond	2	GIP 00304 / planned 486	Parcel-Based Opportunity (aspirational)	5.73	3.84	67%	0.003	0.037
Richmond	2	ROW 16518	ROW Opportunity	2.48	1.62	65%	0.005	0.037
Richmond	2	ROW 211	ROW Opportunity	4.70	3.08	66%	0.003	0.037
Richmond	2	Parcel 375480	Parcel-Based Opportunity	39.00	23.68	61%	0.000	0.037
Richmond	2	ROW 11885	ROW Opportunity	0.22	0.15	68%	0.041	0.036
Richmond	2	ROW 19949	ROW Opportunity	0.81	0.55	68%	0.013	0.036
Richmond	2	Parcel 126574	Regional Opportunity	0.58	0.15	26%	0.016	0.036
Richmond	2	ROW 3755	ROW Opportunity	0.29	0.11	38%	0.030	0.035
Richmond	2	ROW 16433	ROW Opportunity	1.10	0.75	68%	0.009	0.035
Richmond	2	ROW 16437	ROW Opportunity	3.09	2.10	68%	0.004	0.035
Richmond	2	ROW 16443	ROW Opportunity	3.11	2.01	65%	0.004	0.035
Richmond	2	ROW 246	ROW Opportunity	0.43	0.31	72%	0.022	0.035
Richmond	2	Parcel 146294	Parcel-Based Opportunity	14.14	9.02	64%	0.001	0.035
Richmond	2	Parcel 137626	Regional Opportunity	1.25	0.75	60%	0.008	0.035
Richmond	2	Parcel 133977	Regional Opportunity	1.28	0.66	52%	0.008	0.035
Richmond	2	Parcel 195923	Parcel-Based Opportunity	0.15	0.06	40%	0.059	0.035
Richmond	2	ROW 17021	ROW Opportunity	0.48	0.20	42%	0.019	0.034
Richmond	2	ROW 191	ROW Opportunity	1.49	1.10	74%	0.007	0.034
Richmond	2	ROW 11014	ROW Opportunity	5.98	3.95	66%	0.002	0.034
Richmond	2	ROW 15831	ROW Opportunity	9.53	6.34	67%	0.002	0.034
Richmond	2	ROW 283	ROW Opportunity	6.12	4.23	69%	0.002	0.034
Richmond	2	ROW 56	ROW Opportunity	1.53	1.09	71%	0.007	0.034
Richmond	2	Parcel 234570	Parcel-Based Opportunity	21.31	2.72	13%	0.001	0.034
Richmond	2	ROW 12145	ROW Opportunity	8.53	5.57	65%	0.002	0.033
Richmond	2	ROW 21542	ROW Opportunity	8.21	5.22	64%	0.002	0.033
Richmond	2	ROW 239	ROW Opportunity	10.01	6.58	66%	0.002	0.033
Richmond	2	ROW 6159	ROW Opportunity	6.69	4.35	65%	0.002	0.033
Richmond	2	ROW 85	ROW Opportunity	0.84	0.57	68%	0.011	0.033
Richmond	2	Parcel 120275	Regional Opportunity	1.53	0.52	34%	0.006	0.033
Richmond	2	Parcel 154534	Parcel-Based Opportunity	0.21	0.14	67%	0.039	0.033
Richmond	2	Parcel 111332	Parcel-Based Opportunity	0.26	0.11	42%	0.032	0.033
Richmond	2	GIP 00302 / planned 492	Parcel-Based Opportunity (aspirational)	2.50	1.76	70%	0.005	0.032
Richmond	2	ROW 243	ROW Opportunity	9.52	6.21	65%	0.002	0.032
Richmond	2	ROW 282	ROW Opportunity	5.99	4.14	69%	0.002	0.032
Richmond	2	Parcel 119762	Regional Opportunity	1.08	0.35	32%	0.008	0.032
Richmond	2	Parcel 125511	Parcel-Based Opportunity	0.17	0.11	65%	0.046	0.032
Richmond	2	GIP 00314 / planned 488	Parcel-Based Opportunity (aspirational)	2.69	1.81	67%	0.004	0.031

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Richmond	2	ROW 19630	ROW Opportunity	2.57	0.92	36%	0.004	0.031
Richmond	2	ROW 259	ROW Opportunity	7.70	5.06	66%	0.002	0.031
Richmond	2	ROW 298	ROW Opportunity	5.20	3.55	68%	0.003	0.031
Richmond	2	ROW 323	ROW Opportunity	5.79	3.97	69%	0.002	0.031
Richmond	2	Parcel 207080	Parcel-Based Opportunity	11.36	4.54	40%	0.001	0.031
Richmond	2	Parcel 142243	Regional Opportunity	0.79	0.65	82%	0.012	0.031
Richmond	2	ROW 5978	ROW Opportunity	1.46	0.86	59%	0.007	0.030
Richmond	2	ROW 16432	ROW Opportunity	0.17	0.13	76%	0.042	0.030
Richmond	2	ROW 16444	ROW Opportunity	1.83	1.25	68%	0.005	0.030
Richmond	2	ROW 16533	ROW Opportunity	0.59	0.36	61%	0.014	0.030
Richmond	2	ROW 80	ROW Opportunity	0.96	0.68	71%	0.009	0.030
Richmond	2	ROW 11807	ROW Opportunity	9.05	5.81	64%	0.001	0.029
Richmond	2	ROW 12123	ROW Opportunity	8.06	5.15	64%	0.002	0.029
Richmond	2	ROW 21089	ROW Opportunity	2.88	1.39	48%	0.004	0.029
Richmond	2	Parcel 198527	Parcel-Based Opportunity	7.70	0.55	7%	0.002	0.029
Richmond	2	GIP 00329 / planned 519	Parcel-Based Opportunity (aspirational)	7.69	5.20	68%	0.002	0.028
Richmond	2	ROW 10074	ROW Opportunity	9.03	5.68	63%	0.001	0.028
Richmond	2	ROW 10718	ROW Opportunity	7.91	4.98	63%	0.002	0.028
Richmond	2	ROW 16439	ROW Opportunity	1.16	0.76	66%	0.008	0.028
Richmond	2	ROW 16546	ROW Opportunity	2.59	1.81	70%	0.004	0.028
Richmond	2	ROW 7714	ROW Opportunity	6.37	4.16	65%	0.002	0.028
Richmond	2	Parcel 150301	Regional Opportunity	0.90	0.66	73%	0.009	0.028
Richmond	2	Parcel 120253	Parcel-Based Opportunity	0.33	0.14	42%	0.021	0.028
Richmond	2	GIP 00306 / planned 517	Parcel-Based Opportunity (aspirational)	6.85	4.64	68%	0.002	0.027
Richmond	2	ROW 11010	ROW Opportunity	5.76	3.76	65%	0.002	0.027
Richmond	2	ROW 13419	ROW Opportunity	1.62	1.06	65%	0.006	0.027
Richmond	2	ROW 16451	ROW Opportunity	5.28	3.42	65%	0.002	0.027
Richmond	2	ROW 16525	ROW Opportunity	1.21	0.69	57%	0.007	0.027
Richmond	2	ROW 20279	ROW Opportunity	6.17	4.13	67%	0.002	0.027
Richmond	2	ROW 241	ROW Opportunity	7.41	4.90	66%	0.002	0.027
Richmond	2	ROW 280	ROW Opportunity	6.70	4.42	66%	0.002	0.027
Richmond	2	ROW 7716	ROW Opportunity	5.73	3.73	65%	0.002	0.027
Richmond	2	ROW 11626	ROW Opportunity	0.14	0.09	64%	0.044	0.026
Richmond	2	ROW 16463	ROW Opportunity	6.46	4.31	67%	0.002	0.026
Richmond	2	ROW 238	ROW Opportunity	0.20	0.14	70%	0.033	0.026
Richmond	2	ROW 7717	ROW Opportunity	2.09	1.39	67%	0.004	0.026
Richmond	2	ROW 8365	ROW Opportunity	9.43	5.05	54%	0.001	0.026
Richmond	2	ROW 8849	ROW Opportunity	6.28	4.11	65%	0.002	0.026
Richmond	2	ROW 9165	ROW Opportunity	0.31	0.19	61%	0.021	0.026
Richmond	2	ROW 9347	ROW Opportunity	8.44	5.50	65%	0.001	0.026
Richmond	2	Parcel 150205	Regional Opportunity	0.89	0.61	69%	0.009	0.026
Richmond	2	Parcel 375468	Parcel-Based Opportunity	0.97	0.09	9%	0.009	0.026
Richmond	2	ROW 190	ROW Opportunity	1.00	0.73	73%	0.008	0.025
Richmond	2	ROW 12098	ROW Opportunity	3.92	2.44	62%	0.003	0.025
Richmond	2	ROW 13064	ROW Opportunity	12.19	6.07	50%	0.001	0.025
Richmond	2	ROW 169	ROW Opportunity	0.64	0.50	78%	0.011	0.025
Richmond	2	ROW 207	ROW Opportunity	0.87	0.60	69%	0.009	0.025
Richmond	2	ROW 252	ROW Opportunity	5.36	3.50	65%	0.002	0.025
Richmond	2	Parcel 227484	Parcel-Based Opportunity	150.23	0.93	1%	0.000	0.025
Richmond	2	ROW 16476	ROW Opportunity	0.55	0.32	58%	0.012	0.024
Richmond	2	ROW 16495	ROW Opportunity	2.25	1.50	67%	0.004	0.024
Richmond	2	ROW 188	ROW Opportunity	1.08	0.78	72%	0.007	0.024
Richmond	2	ROW 9992	ROW Opportunity	2.54	1.65	65%	0.003	0.024
Richmond	2	GIP 00387 / Parcel 132965	Regional Opportunity (aspirational)	0.59	0.46	78%	0.011	0.023
Richmond	2	GIP 00396 / Parcel 133558	Regional Opportunity (aspirational)	0.63	0.52	83%	0.011	0.023
Richmond	2	GIP 00301 / planned 468	Parcel-Based Opportunity (aspirational)	18.01	5.20	29%	0.001	0.023
Richmond	2	GIP 00310 / planned 186	Parcel-Based Opportunity (aspirational)	18.01	5.20	29%	0.001	0.023
Richmond	2	GIP 00308 / planned 521	Parcel-Based Opportunity (aspirational)	5.57	3.75	67%	0.002	0.023
Richmond	2	ROW 59	ROW Opportunity	1.06	0.68	64%	0.007	0.023
Richmond	2	ROW 11852	ROW Opportunity	0.88	0.58	66%	0.008	0.023
Richmond	2	ROW 128	ROW Opportunity	3.64	2.51	69%	0.003	0.023
Richmond	2	ROW 14749	ROW Opportunity	1.79	0.86	48%	0.004	0.023
Richmond	2	ROW 16490	ROW Opportunity	2.47	1.59	64%	0.003	0.023
Richmond	2	ROW 216	ROW Opportunity	5.26	3.39	64%	0.002	0.023
Richmond	2	ROW 284	ROW Opportunity	4.68	3.14	67%	0.002	0.023
Richmond	2	ROW 345	ROW Opportunity	7.17	4.37	61%	0.001	0.023
Richmond	2	ROW 4274	ROW Opportunity	0.75	0.51	68%	0.009	0.023
Richmond	2	ROW 7798	ROW Opportunity	3.24	2.02	62%	0.003	0.023
Richmond	2	ROW 862	ROW Opportunity	0.62	0.49	79%	0.011	0.023
Richmond	2	GIP 00390 / Parcel 133528	Regional Opportunity (aspirational)	0.61	0.50	82%	0.011	0.022
Richmond	2	GIP 00341 / planned 529	Parcel-Based Opportunity (aspirational)	8.35	3.96	47%	0.001	0.022
Richmond	2	ROW 6276	ROW Opportunity	0.11	0.08	73%	0.051	0.022
Richmond	2	ROW 14348	ROW Opportunity	4.73	2.85	60%	0.002	0.022
Richmond	2	ROW 16540	ROW Opportunity	3.11	1.96	63%	0.003	0.022
Richmond	2	ROW 16547	ROW Opportunity	3.20	2.06	64%	0.003	0.022
Richmond	2	ROW 4556	ROW Opportunity	4.85	2.97	61%	0.002	0.022
Richmond	2	ROW 6850	ROW Opportunity	5.70	3.79	66%	0.002	0.022
Richmond	2	ROW 7554	ROW Opportunity	4.93	2.93	59%	0.002	0.022
Richmond	2	ROW 8344	ROW Opportunity	2.79	1.43	51%	0.003	0.022
Richmond	2	ROW 9354	ROW Opportunity	4.61	2.81	61%	0.002	0.022
Richmond	2	planned 187	Planned Unlined Bioretention	0.48	0.29	60%	0.013	0.022
Richmond	2	planned 514	Planned Unlined Swale	0.26	0.17	65%	0.022	0.022
Richmond	2	Parcel 231444	Parcel-Based Opportunity	9.82	5.16	53%	0.001	0.022
Richmond	2	Parcel 177214	Parcel-Based Opportunity	11.57	5.65	49%	0.001	0.022
Richmond	2	Parcel 197712	Parcel-Based Opportunity	0.34	0.05	15%	0.017	0.022
Richmond	2	ROW 16459	ROW Opportunity	3.83	2.58	67%	0.002	0.021
Richmond	2	ROW 20540	ROW Opportunity	1.86	1.20	65%	0.004	0.021
Richmond	2	ROW 4276	ROW Opportunity	1.18	0.85	72%	0.006	0.021
Richmond	2	ROW 4470	ROW Opportunity	5.90	3.81	65%	0.002	0.021
Richmond	2	ROW 68	ROW Opportunity	3.20	2.16	68%	0.003	0.021
Richmond	2	Parcel 142495	Regional Opportunity	1.67	1.01	60%	0.004	0.021
Richmond	2	Parcel 150789	Regional Opportunity	0.68	0.49	72%	0.009	0.021
Richmond	2	Parcel 136865	Regional Opportunity	0.56	0.40	71%	0.011	0.021
Richmond	2	ROW 13418	ROW Opportunity	2.49	1.71	69%	0.003	0.020

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Richmond	2	ROW 4128	ROW Opportunity	0.53	0.40	75%	0.011	0.020
Richmond	2	ROW 7747	ROW Opportunity	4.04	2.68	66%	0.002	0.020
Richmond	2	ROW 12816	ROW Opportunity	5.38	3.23	60%	0.002	0.020
Richmond	2	ROW 16450	ROW Opportunity	5.38	3.61	67%	0.002	0.020
Richmond	2	ROW 16677	ROW Opportunity	4.69	2.78	59%	0.002	0.020
Richmond	2	ROW 18208	ROW Opportunity	1.75	1.14	65%	0.004	0.020
Richmond	2	ROW 1991	ROW Opportunity	7.58	4.72	62%	0.001	0.020
Richmond	2	ROW 20007	ROW Opportunity	6.72	4.21	63%	0.001	0.020
Richmond	2	ROW 501	ROW Opportunity	5.00	3.06	61%	0.002	0.020
Richmond	2	ROW 6847	ROW Opportunity	5.45	3.61	66%	0.002	0.020
Richmond	2	ROW 7333	ROW Opportunity	3.29	2.13	65%	0.003	0.020
Richmond	2	ROW 9126	ROW Opportunity	1.07	0.38	36%	0.005	0.020
Richmond	2	Parcel 164500	Regional Opportunity	1.15	0.45	39%	0.005	0.020
Richmond	2	GIP 00330 /planned 141	Parcel-Based Opportunity (aspirational)	18.40	3.20	17%	0.000	0.019
Richmond	2	ROW 16534	ROW Opportunity	1.86	1.27	68%	0.004	0.019
Richmond	2	ROW 12536	ROW Opportunity	2.88	1.31	45%	0.002	0.019
Richmond	2	ROW 17129	ROW Opportunity	10.19	4.51	44%	0.001	0.019
Richmond	2	ROW 3972	ROW Opportunity	0.65	0.40	62%	0.009	0.019
Richmond	2	ROW 6954	ROW Opportunity	0.73	0.55	75%	0.008	0.019
Richmond	2	Parcel 196851	Parcel-Based Opportunity	4.96	0.08	2%	0.002	0.019
Richmond	2	GIP 00364 / Parcel 140096	Parcel-Based Opportunity (aspirational)	6.62	4.81	73%	0.001	0.018
Richmond	2	GIP 00296 /planned 511	Parcel-Based Opportunity (aspirational)	2.00	1.36	68%	0.003	0.018
Richmond	2	GIP 00299 /planned 522	Parcel-Based Opportunity (aspirational)	5.90	4.00	68%	0.001	0.018
Richmond	2	ROW 6066	ROW Opportunity	0.37	0.11	30%	0.013	0.018
Richmond	2	ROW 160	ROW Opportunity	4.58	3.15	69%	0.002	0.018
Richmond	2	ROW 16470	ROW Opportunity	2.55	1.66	65%	0.003	0.018
Richmond	2	ROW 20777	ROW Opportunity	1.92	1.28	67%	0.003	0.018
Richmond	2	ROW 213	ROW Opportunity	5.91	3.79	64%	0.001	0.018
Richmond	2	ROW 2915	ROW Opportunity	4.41	2.90	66%	0.002	0.018
Richmond	2	ROW 2928	ROW Opportunity	3.99	2.40	60%	0.002	0.018
Richmond	2	ROW 3295	ROW Opportunity	0.13	0.06	46%	0.035	0.018
Richmond	2	ROW 4531	ROW Opportunity	0.29	0.15	52%	0.016	0.018
Richmond	2	ROW 67	ROW Opportunity	1.78	1.28	72%	0.004	0.018
Richmond	2	Parcel 126885	Regional Opportunity	1.12	0.39	35%	0.005	0.018
Richmond	2	Parcel 152942	Regional Opportunity	0.52	0.42	81%	0.010	0.018
Richmond	2	Parcel 151124	Parcel-Based Opportunity	0.47	0.35	74%	0.011	0.018
Richmond	2	Parcel 151604	Regional Opportunity	0.50	0.42	84%	0.011	0.018
Richmond	2	ROW 16524	ROW Opportunity	0.17	0.12	71%	0.027	0.017
Richmond	2	ROW 16453	ROW Opportunity	4.49	2.90	65%	0.002	0.017
Richmond	2	ROW 16920	ROW Opportunity	0.89	0.46	52%	0.006	0.017
Richmond	2	ROW 17076	ROW Opportunity	4.77	2.85	60%	0.002	0.017
Richmond	2	ROW 290	ROW Opportunity	1.30	0.94	72%	0.005	0.017
Richmond	2	ROW 4396	ROW Opportunity	2.92	1.91	65%	0.002	0.017
Richmond	2	planned 489	Planned Unlined Bioretention	1.91	1.34	70%	0.003	0.017
Richmond	2	Parcel 209985	Parcel-Based Opportunity	7.78	4.24	54%	0.001	0.017
Richmond	2	GIP 00311 /planned 480	Parcel-Based Opportunity (aspirational)	3.92	2.68	68%	0.002	0.016
Richmond	2	ROW 115	ROW Opportunity	3.74	2.52	67%	0.002	0.016
Richmond	2	ROW 1385	ROW Opportunity	0.62	0.34	55%	0.008	0.016
Richmond	2	ROW 250	ROW Opportunity	2.22	1.47	66%	0.003	0.016
Richmond	2	ROW 314	ROW Opportunity	4.06	2.72	67%	0.002	0.016
Richmond	2	ROW 3741	ROW Opportunity	0.59	0.40	68%	0.008	0.016
Richmond	2	ROW 4398	ROW Opportunity	3.21	2.08	65%	0.002	0.016
Richmond	2	ROW 4866	ROW Opportunity	5.85	3.86	66%	0.001	0.016
Richmond	2	planned 94	Planned Creek/Marsh Restoration	4.16	2.12	51%	0.002	0.016
Richmond	2	Parcel 50787	Parcel-Based Opportunity	0.13	0.09	69%	0.033	0.016
Richmond	2	Parcel 150106	Parcel-Based Opportunity	0.47	0.36	77%	0.010	0.016
Richmond	2	GIP 00344 /planned 137	Parcel-Based Opportunity (aspirational)	9.66	3.71	38%	0.001	0.015
Richmond	2	ROW 12101	ROW Opportunity	1.93	1.31	68%	0.003	0.015
Richmond	2	ROW 81	ROW Opportunity	1.73	1.19	69%	0.003	0.015
Richmond	2	ROW 16447	ROW Opportunity	3.16	2.13	67%	0.002	0.015
Richmond	2	ROW 16479	ROW Opportunity	0.89	0.59	66%	0.006	0.015
Richmond	2	ROW 17605	ROW Opportunity	7.60	3.45	45%	0.001	0.015
Richmond	2	ROW 18926	ROW Opportunity	4.43	2.72	61%	0.002	0.015
Richmond	2	ROW 20316	ROW Opportunity	2.89	1.90	66%	0.002	0.015
Richmond	2	ROW 20542	ROW Opportunity	0.72	0.51	71%	0.007	0.015
Richmond	2	ROW 20895	ROW Opportunity	0.46	0.22	48%	0.009	0.015
Richmond	2	ROW 21152	ROW Opportunity	4.90	3.36	69%	0.001	0.015
Richmond	2	ROW 258	ROW Opportunity	0.55	0.39	71%	0.008	0.015
Richmond	2	ROW 6047	ROW Opportunity	4.81	3.21	67%	0.001	0.015
Richmond	2	ROW 78	ROW Opportunity	0.84	0.63	75%	0.006	0.015
Richmond	2	ROW 93	ROW Opportunity	5.91	3.85	65%	0.001	0.015
Richmond	2	Parcel 160376	Parcel-Based Opportunity	4.81	4.00	83%	0.001	0.015
Richmond	2	ROW 16611	ROW Opportunity	1.02	0.78	76%	0.005	0.014
Richmond	2	ROW 11012	ROW Opportunity	2.36	1.46	62%	0.002	0.014
Richmond	2	ROW 129	ROW Opportunity	0.42	0.29	69%	0.010	0.014
Richmond	2	ROW 14437	ROW Opportunity	13.77	3.20	23%	0.000	0.014
Richmond	2	ROW 16491	ROW Opportunity	1.26	0.81	64%	0.004	0.014
Richmond	2	ROW 16494	ROW Opportunity	2.27	1.51	67%	0.003	0.014
Richmond	2	ROW 19951	ROW Opportunity	4.44	2.66	60%	0.001	0.014
Richmond	2	ROW 286	ROW Opportunity	2.29	1.57	69%	0.003	0.014
Richmond	2	ROW 89	ROW Opportunity	1.38	0.90	65%	0.004	0.014
Richmond	2	ROW 9417	ROW Opportunity	2.08	1.34	64%	0.003	0.014
Richmond	2	Parcel 375481	Parcel-Based Opportunity	4.63	2.18	47%	0.002	0.014
Richmond	2	Parcel 139599	Parcel-Based Opportunity	5.30	3.53	67%	0.001	0.014
Richmond	2	Parcel 143637	Regional Opportunity	0.71	0.32	45%	0.006	0.014
Richmond	2	Parcel 143456	Parcel-Based Opportunity	0.42	0.32	76%	0.010	0.014
Richmond	2	Parcel 139156	Regional Opportunity	2.90	1.37	47%	0.002	0.014
Richmond	2	Parcel 136418	Regional Opportunity	0.51	0.31	61%	0.008	0.014
Richmond	2	Parcel 47763	Parcel-Based Opportunity	4.66	2.90	62%	0.001	0.014
Richmond	2	Parcel 191941	Parcel-Based Opportunity	7.01	0.25	4%	0.000	0.014
Richmond	2	GIP 00461 / ROW 17569	ROW Opportunity (aspirational)	2.96	1.75	59%	0.002	0.013
Richmond	2	GIP 00315 /planned 171	Parcel-Based Opportunity (aspirational)	16.16	2.93	18%	0.000	0.013
Richmond	2	GIP 00317 /planned 475	Parcel-Based Opportunity (aspirational)	16.16	2.93	18%	0.000	0.013
Richmond	2	GIP 00303 /planned 508	Parcel-Based Opportunity (aspirational)	3.47	2.33	67%	0.002	0.013

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Richmond	2	ROW 12140	ROW Opportunity	0.81	0.58	72%	0.005	0.013
Richmond	2	ROW 2595	ROW Opportunity	1.07	0.42	39%	0.004	0.013
Richmond	2	ROW 163	ROW Opportunity	5.21	3.41	65%	0.001	0.013
Richmond	2	ROW 194	ROW Opportunity	4.22	2.78	66%	0.001	0.013
Richmond	2	ROW 6848	ROW Opportunity	2.21	1.46	66%	0.002	0.013
Richmond	2	ROW 7330	ROW Opportunity	5.35	3.48	65%	0.001	0.013
Richmond	2	ROW 8151	ROW Opportunity	4.36	2.94	67%	0.001	0.013
Richmond	2	Parcel 155750	Parcel-Based Opportunity	0.43	0.30	70%	0.009	0.013
Richmond	2	Parcel 112290	Regional Opportunity	1.12	0.16	14%	0.005	0.013
Richmond	2	GIP 00297 / planned 520	Parcel-Based Opportunity (aspirational)	2.35	1.60	68%	0.002	0.012
Richmond	2	ROW 14369	ROW Opportunity	0.27	0.09	33%	0.012	0.012
Richmond	2	ROW 281	ROW Opportunity	0.38	0.28	74%	0.010	0.012
Richmond	2	ROW 6101	ROW Opportunity	4.34	2.67	62%	0.001	0.012
Richmond	2	ROW 7748	ROW Opportunity	4.34	2.86	66%	0.001	0.012
Richmond	2	ROW 913	ROW Opportunity	0.22	0.10	45%	0.015	0.012
Richmond	2	ROW 132	ROW Opportunity	1.65	1.13	68%	0.003	0.012
Richmond	2	ROW 13338	ROW Opportunity	1.01	0.70	69%	0.004	0.012
Richmond	2	ROW 14167	ROW Opportunity	4.84	3.18	66%	0.001	0.012
Richmond	2	ROW 16466	ROW Opportunity	3.17	2.13	67%	0.002	0.012
Richmond	2	ROW 16474	ROW Opportunity	2.85	1.84	65%	0.002	0.012
Richmond	2	ROW 16502	ROW Opportunity	2.06	1.33	65%	0.002	0.012
Richmond	2	ROW 204	ROW Opportunity	4.79	3.07	64%	0.001	0.012
Richmond	2	ROW 253	ROW Opportunity	4.86	3.10	64%	0.001	0.012
Richmond	2	ROW 4277	ROW Opportunity	0.43	0.27	63%	0.008	0.012
Richmond	2	ROW 5573	ROW Opportunity	1.06	0.63	59%	0.004	0.012
Richmond	2	ROW 6558	ROW Opportunity	1.87	1.00	53%	0.002	0.012
Richmond	2	ROW 9680	ROW Opportunity	2.49	1.58	63%	0.002	0.012
Richmond	2	Parcel 225370	Parcel-Based Opportunity	25.07	3.05	12%	0.000	0.012
Richmond	2	Parcel 199669	Parcel-Based Opportunity	5.58	1.49	27%	0.001	0.012
Richmond	2	Parcel 211418	Parcel-Based Opportunity	9.02	2.38	26%	0.001	0.012
Richmond	2	Parcel 147723	Parcel-Based Opportunity	0.34	0.27	79%	0.010	0.012
Richmond	2	Parcel 150072	Parcel-Based Opportunity	0.36	0.27	75%	0.010	0.012
Richmond	2	Parcel 375470	Parcel-Based Opportunity	57.79	1.88	3%	0.000	0.012
Richmond	2	GIP 00312 / planned 193	Parcel-Based Opportunity (aspirational)	0.97	0.27	28%	0.004	0.011
Richmond	2	GIP 00320 / planned 509	Parcel-Based Opportunity (aspirational)	3.02	2.04	68%	0.002	0.011
Richmond	2	GIP 00327 / planned 510	Parcel-Based Opportunity (aspirational)	2.11	1.43	68%	0.002	0.011
Richmond	2	ROW 11660	ROW Opportunity	0.34	0.18	53%	0.010	0.011
Richmond	2	ROW 14811	ROW Opportunity	0.29	0.19	66%	0.011	0.011
Richmond	2	ROW 20469	ROW Opportunity	2.29	1.56	68%	0.002	0.011
Richmond	2	ROW 111	ROW Opportunity	3.22	2.10	65%	0.002	0.011
Richmond	2	ROW 13123	ROW Opportunity	1.20	0.83	69%	0.003	0.011
Richmond	2	ROW 14072	ROW Opportunity	1.98	1.16	59%	0.002	0.011
Richmond	2	ROW 16446	ROW Opportunity	1.36	0.89	65%	0.003	0.011
Richmond	2	ROW 16468	ROW Opportunity	3.10	2.04	66%	0.002	0.011
Richmond	2	ROW 16483	ROW Opportunity	2.83	1.77	63%	0.002	0.011
Richmond	2	ROW 19203	ROW Opportunity	3.74	2.18	58%	0.001	0.011
Richmond	2	ROW 19688	ROW Opportunity	4.52	2.76	61%	0.001	0.011
Richmond	2	ROW 249	ROW Opportunity	4.36	2.85	65%	0.001	0.011
Richmond	2	ROW 322	ROW Opportunity	4.52	3.02	67%	0.001	0.011
Richmond	2	ROW 3981	ROW Opportunity	2.93	1.87	64%	0.002	0.011
Richmond	2	ROW 4397	ROW Opportunity	3.99	2.39	60%	0.001	0.011
Richmond	2	ROW 9967	ROW Opportunity	5.27	2.53	48%	0.001	0.011
Richmond	2	Parcel 243861	Parcel-Based Opportunity	33.58	2.75	8%	0.000	0.011
Richmond	2	Parcel 121594	Parcel-Based Opportunity	3.20	1.53	48%	0.002	0.011
Richmond	2	Parcel 128233	Parcel-Based Opportunity	3.85	2.80	73%	0.001	0.011
Richmond	2	Parcel 149557	Parcel-Based Opportunity	0.35	0.25	71%	0.009	0.011
Richmond	2	Parcel 145759	Parcel-Based Opportunity	0.34	0.25	74%	0.010	0.011
Richmond	2	Parcel 167393	Parcel-Based Opportunity	4.98	2.79	56%	0.001	0.011
Richmond	2	Parcel 152538	Parcel-Based Opportunity	0.37	0.26	70%	0.009	0.011
Richmond	2	Parcel 150416	Parcel-Based Opportunity	0.32	0.27	84%	0.011	0.011
Richmond	2	Parcel 112193	Parcel-Based Opportunity	0.18	0.07	39%	0.016	0.011
Richmond	2	Parcel 116931	Parcel-Based Opportunity	11.22	0.40	4%	0.000	0.011
Richmond	2	GIP 00374 / Parcel 135904	Parcel-Based Opportunity (aspirational)	8.78	2.30	26%	0.001	0.010
Richmond	2	ROW 12330	ROW Opportunity	0.08	0.04	50%	0.032	0.010
Richmond	2	ROW 16763	ROW Opportunity	0.59	0.37	63%	0.005	0.010
Richmond	2	ROW 17322	ROW Opportunity	0.62	0.22	35%	0.005	0.010
Richmond	2	ROW 106	ROW Opportunity	2.85	1.90	67%	0.002	0.010
Richmond	2	ROW 12120	ROW Opportunity	3.47	1.90	55%	0.001	0.010
Richmond	2	ROW 16210	ROW Opportunity	1.50	0.99	66%	0.003	0.010
Richmond	2	ROW 16841	ROW Opportunity	3.01	1.97	65%	0.002	0.010
Richmond	2	ROW 16843	ROW Opportunity	2.85	1.68	59%	0.002	0.010
Richmond	2	ROW 17073	ROW Opportunity	3.30	2.03	62%	0.002	0.010
Richmond	2	ROW 17749	ROW Opportunity	3.83	2.47	64%	0.001	0.010
Richmond	2	ROW 215	ROW Opportunity	3.95	2.54	64%	0.001	0.010
Richmond	2	ROW 3014	ROW Opportunity	0.11	0.07	64%	0.025	0.010
Richmond	2	ROW 342	ROW Opportunity	0.85	0.53	62%	0.004	0.010
Richmond	2	ROW 3511	ROW Opportunity	1.82	1.16	64%	0.002	0.010
Richmond	2	ROW 5040	ROW Opportunity	3.33	2.12	64%	0.001	0.010
Richmond	2	ROW 5698	ROW Opportunity	4.79	2.31	48%	0.001	0.010
Richmond	2	planned 490	Planned Unlined Bioretention	3.29	2.20	67%	0.001	0.010
Richmond	2	Parcel 233025	Parcel-Based Opportunity	7.10	2.14	30%	0.001	0.010
Richmond	2	Parcel 199702	Parcel-Based Opportunity	3.99	2.43	61%	0.001	0.010
San Pablo	2	GIP 00051 / ROW 7812	ROW Opportunity (aspirational)	7.18	4.82	67%	0.038	1.114
San Pablo	2	ROW 16921	ROW Opportunity	12.99	7.46	57%	0.008	0.353
San Pablo	2	planned 36	Planned Flood Control Basin	38.92	17.91	46%	0.002	0.256
San Pablo	2	planned 162	Planned Unlined Bioretention	53.22	35.34	66%	0.002	0.246
San Pablo	2	ROW 16388	ROW Opportunity	7.27	5.13	71%	0.010	0.245
San Pablo	2	planned 302	Planned Creek/Marsh Restoration	3.18	1.46	46%	0.019	0.235
San Pablo	2	ROW 20797	ROW Opportunity	1.05	0.93	89%	0.051	0.214
San Pablo	2	ROW 7812	ROW Opportunity	1.06	0.70	66%	0.038	0.162
San Pablo	2	ROW 16905	ROW Opportunity	5.86	3.97	68%	0.007	0.138
San Pablo	2	ROW 16907	ROW Opportunity	7.80	5.26	67%	0.005	0.127
San Pablo	2	ROW 16903	ROW Opportunity	4.25	2.88	68%	0.008	0.119
San Pablo	2	ROW 6559	ROW Opportunity	12.76	7.53	59%	0.003	0.114

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
San Pablo	2	planned 304	Planned Creek/Marsh Restoration	28.94	14.49	50%	0.002	0.105
San Pablo	2	GIP 00059 / SD MasterPlan	ROW Opportunity (aspirational)	29.73	19.48	66%	0.001	0.094
San Pablo	2	ROW 4126	ROW Opportunity	0.60	0.43	72%	0.038	0.092
San Pablo	2	ROW 19846	ROW Opportunity	6.35	3.77	59%	0.004	0.076
San Pablo	2	ROW 2698	ROW Opportunity	8.13	5.52	68%	0.003	0.074
San Pablo	2	ROW 2767	ROW Opportunity	1.26	0.75	60%	0.015	0.070
San Pablo	2	GIP 00049 / ROW 11891	ROW Opportunity (aspirational)	7.98	5.43	68%	0.003	0.068
San Pablo	2	ROW 189	ROW Opportunity	3.45	2.35	68%	0.006	0.068
San Pablo	2	ROW 2769	ROW Opportunity	5.25	2.83	54%	0.004	0.063
San Pablo	2	ROW 7219	ROW Opportunity	1.16	0.79	68%	0.014	0.061
San Pablo	2	ROW 9756	ROW Opportunity	3.58	2.30	64%	0.006	0.061
San Pablo	2	ROW 6033	ROW Opportunity	7.68	5.03	65%	0.003	0.055
San Pablo	2	ROW 77	ROW Opportunity	0.39	0.30	77%	0.034	0.052
San Pablo	2	ROW 4227	ROW Opportunity	4.63	2.97	64%	0.004	0.047
San Pablo	2	ROW 192	ROW Opportunity	3.68	2.55	69%	0.004	0.045
San Pablo	2	ROW 18421	ROW Opportunity	9.68	6.08	63%	0.002	0.039
San Pablo	2	ROW 786	ROW Opportunity	5.66	3.27	58%	0.003	0.039
San Pablo	2	ROW 16914	ROW Opportunity	2.49	1.66	67%	0.005	0.036
San Pablo	2	ROW 18397	ROW Opportunity	2.76	1.78	64%	0.004	0.035
San Pablo	2	ROW 4228	ROW Opportunity	2.60	1.68	65%	0.005	0.035
San Pablo	2	ROW 16014	ROW Opportunity	5.29	3.53	67%	0.003	0.035
San Pablo	2	GIP 00050 / ROW 18927	ROW Opportunity (aspirational)	6.33	4.23	67%	0.002	0.033
San Pablo	2	ROW 18924	ROW Opportunity	0.25	0.19	76%	0.033	0.032
San Pablo	2	ROW 16015	ROW Opportunity	1.34	0.88	66%	0.007	0.031
San Pablo	2	ROW 15641	ROW Opportunity	4.30	2.76	64%	0.003	0.030
San Pablo	2	ROW 4668	ROW Opportunity	2.52	1.68	67%	0.004	0.030
San Pablo	2	ROW 12843	ROW Opportunity	2.13	1.52	71%	0.005	0.029
San Pablo	2	ROW 167	ROW Opportunity	6.95	4.63	67%	0.002	0.028
San Pablo	2	ROW 6930	ROW Opportunity	0.90	0.64	71%	0.009	0.028
San Pablo	2	ROW 15350	ROW Opportunity	1.12	0.66	59%	0.007	0.027
San Pablo	2	ROW 19954	ROW Opportunity	3.17	2.07	65%	0.003	0.027
San Pablo	2	ROW 20000	ROW Opportunity	1.97	1.36	69%	0.005	0.027
San Pablo	2	ROW 165	ROW Opportunity	5.88	3.79	64%	0.002	0.026
San Pablo	2	ROW 17042	ROW Opportunity	5.45	3.63	67%	0.002	0.025
San Pablo	2	ROW 11891	ROW Opportunity	1.83	1.26	69%	0.005	0.024
San Pablo	2	ROW 12558	ROW Opportunity	8.04	4.68	58%	0.001	0.023
San Pablo	2	ROW 16390	ROW Opportunity	1.74	1.08	62%	0.005	0.023
San Pablo	2	ROW 4473	ROW Opportunity	1.50	0.88	59%	0.005	0.022
San Pablo	2	ROW 12611	ROW Opportunity	2.08	1.46	70%	0.004	0.021
San Pablo	2	ROW 4651	ROW Opportunity	1.36	0.86	63%	0.005	0.021
San Pablo	2	Parcel 177888	Regional Opportunity	0.72	0.48	67%	0.009	0.021
San Pablo	2	ROW 52	ROW Opportunity	3.36	1.97	59%	0.002	0.020
San Pablo	2	ROW 21121	ROW Opportunity	4.48	2.81	63%	0.002	0.020
San Pablo	2	ROW 10495	ROW Opportunity	2.74	1.83	67%	0.003	0.019
San Pablo	2	ROW 4471	ROW Opportunity	1.20	0.64	53%	0.005	0.019
San Pablo	2	planned 155	Planned Creek/Marsh Restoration	0.31	0.18	58%	0.016	0.019
San Pablo	2	Parcel 188525	Regional Opportunity	0.59	0.44	75%	0.010	0.019
San Pablo	2	Parcel 174149	Regional Opportunity	1.30	0.40	31%	0.004	0.019
San Pablo	2	ROW 11364	ROW Opportunity	0.57	0.40	70%	0.009	0.018
San Pablo	2	ROW 11808	ROW Opportunity	0.75	0.49	65%	0.008	0.018
San Pablo	2	ROW 125	ROW Opportunity	4.82	3.00	62%	0.002	0.018
San Pablo	2	ROW 12612	ROW Opportunity	2.24	1.38	62%	0.003	0.018
San Pablo	2	ROW 171	ROW Opportunity	3.11	1.99	64%	0.002	0.018
San Pablo	2	ROW 18927	ROW Opportunity	0.12	0.08	67%	0.039	0.018
San Pablo	2	ROW 65	ROW Opportunity	6.84	4.46	65%	0.001	0.018
San Pablo	2	planned 325	Planned Unlined Bioretention	5.36	1.64	31%	0.001	0.018
San Pablo	2	ROW 13089	ROW Opportunity	1.15	0.81	70%	0.005	0.016
San Pablo	2	ROW 16916	ROW Opportunity	0.68	0.48	71%	0.007	0.016
San Pablo	2	ROW 2963	ROW Opportunity	3.78	2.51	66%	0.002	0.016
San Pablo	2	ROW 14830	ROW Opportunity	3.59	2.40	67%	0.002	0.015
San Pablo	2	ROW 108	ROW Opportunity	3.27	2.07	63%	0.002	0.015
San Pablo	2	ROW 170	ROW Opportunity	4.03	2.63	65%	0.002	0.015
San Pablo	2	Parcel 190737	Parcel-Based Opportunity	11.43	3.64	32%	0.001	0.015
San Pablo	2	ROW 19776	ROW Opportunity	2.43	1.55	64%	0.002	0.014
San Pablo	2	ROW 16389	ROW Opportunity	1.15	0.78	68%	0.004	0.013
San Pablo	2	ROW 3087	ROW Opportunity	3.36	2.28	68%	0.002	0.013
San Pablo	2	planned 303	Planned Creek/Marsh Restoration	2.48	1.06	43%	0.002	0.013
San Pablo	2	planned 172	Planned Unlined Swale	2.97	1.38	46%	0.002	0.013
San Pablo	2	planned 342	Planned Creek/Marsh Restoration	3.00	1.41	47%	0.002	0.013
San Pablo	2	planned 343	Planned Habitat Restoration	3.01	1.41	47%	0.002	0.013
San Pablo	2	planned 413	Planned Unlined Bioretention	2.97	1.38	46%	0.002	0.013
San Pablo	2	ROW 2765	ROW Opportunity	0.45	0.32	71%	0.008	0.012
San Pablo	2	ROW 7319	ROW Opportunity	0.65	0.48	74%	0.006	0.012
San Pablo	2	ROW 14301	ROW Opportunity	3.39	2.13	63%	0.002	0.011
San Pablo	2	ROW 114	ROW Opportunity	2.62	1.66	63%	0.002	0.011
San Pablo	2	ROW 15832	ROW Opportunity	0.35	0.24	69%	0.009	0.011
San Pablo	2	ROW 20998	ROW Opportunity	2.84	1.84	65%	0.002	0.011
San Pablo	2	planned 159	Planned Flood Control	0.94	0.44	47%	0.004	0.011
San Pablo	2	planned 160	Planned Flood Control	0.94	0.44	47%	0.004	0.011
San Pablo	2	ROW 2774	ROW Opportunity	0.12	0.08	67%	0.022	0.010
San Pablo	2	ROW 11348	ROW Opportunity	1.55	1.05	68%	0.003	0.010
San Pablo	2	ROW 178	ROW Opportunity	1.53	0.99	65%	0.003	0.010
San Pablo	2	ROW 18545	ROW Opportunity	1.13	0.78	69%	0.003	0.010
San Pablo	2	ROW 604	ROW Opportunity	2.68	1.72	64%	0.002	0.010
San Pablo	2	ROW 76	ROW Opportunity	3.81	2.44	64%	0.001	0.010
San Pablo	2	Parcel 177537	Parcel-Based Opportunity	0.35	0.23	66%	0.009	0.010
San Ramon	2	ROW 16937	ROW Opportunity	14.91	8.01	54%	0.008	0.404
San Ramon	2	ROW 5150	ROW Opportunity	17.26	9.38	54%	0.006	0.361
San Ramon	2	Parcel 1429	Parcel-Based Opportunity	7.08	3.05	43%	0.012	0.288
San Ramon	2	ROW 16938	ROW Opportunity	44.75	26.81	60%	0.002	0.202
San Ramon	2	Parcel 1424	Parcel-Based Opportunity	3.25	2.00	62%	0.016	0.177
San Ramon	2	ROW 13922	ROW Opportunity	5.32	2.95	55%	0.010	0.166
San Ramon	2	ROW 5023	ROW Opportunity	5.42	2.58	48%	0.009	0.161
San Ramon	2	Parcel 74168	Parcel-Based Opportunity	4.28	3.30	77%	0.010	0.154

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
San Ramon	2	ROW 19140	ROW Opportunity	13.00	6.76	52%	0.003	0.112
San Ramon	2	ROW 560	ROW Opportunity	48.47	23.77	49%	0.001	0.102
San Ramon	2	ROW 14434	ROW Opportunity	2.77	1.52	55%	0.011	0.095
San Ramon	2	ROW 16426	ROW Opportunity	1.38	0.83	60%	0.016	0.076
San Ramon	2	ROW 13536	ROW Opportunity	15.98	8.39	53%	0.002	0.068
San Ramon	2	Parcel 59728	Parcel-Based Opportunity	40.01	15.74	39%	0.001	0.066
San Ramon	2	ROW 19361	ROW Opportunity	0.95	0.61	64%	0.015	0.052
San Ramon	2	ROW 5451	ROW Opportunity	24.69	12.16	49%	0.001	0.049
San Ramon	2	Parcel 74549	Regional Opportunity	0.89	0.57	64%	0.015	0.048
San Ramon	2	ROW 7238	ROW Opportunity	5.09	2.65	52%	0.003	0.047
San Ramon	2	ROW 2693	ROW Opportunity	27.57	13.61	49%	0.001	0.046
San Ramon	2	ROW 9268	ROW Opportunity	1.05	0.64	61%	0.013	0.044
San Ramon	2	ROW 14869	ROW Opportunity	14.80	6.94	47%	0.001	0.043
San Ramon	2	ROW 19759	ROW Opportunity	3.77	1.87	50%	0.004	0.043
San Ramon	2	ROW 14030	ROW Opportunity	3.62	2.17	60%	0.004	0.039
San Ramon	2	Parcel 1440	Regional Opportunity	2.20	0.24	11%	0.005	0.039
San Ramon	2	ROW 20234	ROW Opportunity	3.27	1.89	58%	0.004	0.037
San Ramon	2	ROW 2149	ROW Opportunity	13.93	6.98	50%	0.001	0.036
San Ramon	2	Parcel 54308	Regional Opportunity	1.18	0.65	55%	0.008	0.032
San Ramon	2	ROW 2328	ROW Opportunity	0.92	0.30	33%	0.009	0.030
San Ramon	2	ROW 5995	ROW Opportunity	8.73	3.50	40%	0.002	0.030
San Ramon	2	Parcel 73130	Regional Opportunity	1.30	0.32	25%	0.007	0.030
San Ramon	2	Parcel 1133	Parcel-Based Opportunity	9.50	2.66	28%	0.001	0.025
San Ramon	2	Parcel 56107	Parcel-Based Opportunity	16.67	5.24	31%	0.001	0.024
San Ramon	2	Parcel 56619	Parcel-Based Opportunity	11.96	4.45	37%	0.001	0.021
San Ramon	2	ROW 7425	ROW Opportunity	5.04	2.86	57%	0.002	0.020
San Ramon	2	ROW 11940	ROW Opportunity	5.68	2.26	40%	0.002	0.019
San Ramon	2	ROW 12822	ROW Opportunity	14.95	7.56	51%	0.000	0.019
San Ramon	2	ROW 3355	ROW Opportunity	4.30	1.88	44%	0.002	0.019
San Ramon	2	Parcel 54147	Parcel-Based Opportunity	11.94	4.08	34%	0.001	0.019
San Ramon	2	ROW 5148	ROW Opportunity	0.88	0.42	48%	0.007	0.018
San Ramon	2	Parcel 56925	Parcel-Based Opportunity	10.03	3.99	40%	0.001	0.018
San Ramon	2	ROW 17356	ROW Opportunity	7.97	3.72	47%	0.001	0.016
San Ramon	2	ROW 558	ROW Opportunity	2.14	1.25	58%	0.003	0.016
San Ramon	2	ROW 10130	ROW Opportunity	0.82	0.51	62%	0.005	0.014
San Ramon	2	ROW 10239	ROW Opportunity	6.36	3.22	51%	0.001	0.014
San Ramon	2	ROW 14016	ROW Opportunity	5.41	2.19	40%	0.001	0.014
San Ramon	2	ROW 17472	ROW Opportunity	3.74	1.78	48%	0.002	0.014
San Ramon	2	ROW 19366	ROW Opportunity	7.37	3.52	48%	0.001	0.014
San Ramon	2	ROW 6768	ROW Opportunity	2.05	1.31	64%	0.003	0.013
San Ramon	2	ROW 7432	ROW Opportunity	4.06	1.64	40%	0.001	0.013
San Ramon	2	ROW 18224	ROW Opportunity	5.30	2.56	48%	0.001	0.012
San Ramon	2	ROW 3115	ROW Opportunity	3.26	1.35	41%	0.002	0.012
San Ramon	2	ROW 14638	ROW Opportunity	5.32	2.59	49%	0.001	0.011
San Ramon	2	ROW 20860	ROW Opportunity	3.04	1.64	54%	0.002	0.011
San Ramon	2	ROW 6884	ROW Opportunity	4.99	2.61	52%	0.001	0.011
San Ramon	2	ROW 3070	ROW Opportunity	4.82	2.40	50%	0.001	0.010
San Ramon	2	ROW 3632	ROW Opportunity	4.57	2.38	52%	0.001	0.010
Unincorporated	2	planned 32	Planned Unlined Bioretention	460.01	217.16	47%	0.005	8.311
Unincorporated	2	Parcel 234358	Regional Opportunity	437.95	212.62	49%	0.005	8.269
Unincorporated	2	planned 1309	Planned Unlined Swale	33.51	13.65	41%	0.014	1.864
Unincorporated	2	planned 911	Planned Unlined Bioretention	4.69	2.66	57%	0.032	0.628
Unincorporated	2	planned 426	Planned Creek/Marsh Restoration	11.94	3.37	28%	0.012	0.589
Unincorporated	2	Parcel 253891	Parcel-Based Opportunity	31.99	2.26	7%	0.005	0.466
Unincorporated	2	planned 912	Planned Unlined Bioretention	2.85	1.61	56%	0.031	0.380
Unincorporated	2	ROW 15886	ROW Opportunity	10.92	5.78	53%	0.009	0.339
Unincorporated	2	ROW 18993	ROW Opportunity	4.03	1.35	33%	0.019	0.330
Unincorporated	2	Parcel 257160	Regional Opportunity	27.71	15.65	56%	0.004	0.312
Unincorporated	2	planned 928	Planned Unlined Bioretention	12.72	5.77	45%	0.006	0.285
Unincorporated	2	ROW 15469	ROW Opportunity	1.87	1.03	55%	0.032	0.241
Unincorporated	2	ROW 326	ROW Opportunity	5.29	3.11	59%	0.012	0.232
Unincorporated	2	planned 845	Planned Unlined Bioretention	9.56	4.74	50%	0.006	0.193
Unincorporated	2	ROW 4127	ROW Opportunity	4.13	2.65	64%	0.012	0.180
Unincorporated	2	planned 1251	Planned Unlined Bioretention	6.65	3.60	54%	0.008	0.180
Unincorporated	2	planned 134	Planned Unlined Bioretention	7.12	4.36	61%	0.007	0.172
Unincorporated	2	planned 1128	Planned Unlined Bioretention	18.84	6.19	33%	0.003	0.171
Unincorporated	2	ROW 336	ROW Opportunity	1.33	0.82	62%	0.031	0.166
Unincorporated	2	planned 813	Planned Unlined Bioretention	6.43	3.65	57%	0.007	0.166
Unincorporated	2	ROW 18095	ROW Opportunity	1.02	0.74	73%	0.040	0.164
Unincorporated	2	planned 834	Planned Unlined Bioretention	6.15	3.59	58%	0.007	0.160
Unincorporated	2	planned 1158	Planned Unlined Bioretention	4.47	2.62	59%	0.008	0.127
Unincorporated	2	Parcel 231873	Regional Opportunity	4.42	2.78	63%	0.008	0.126
Unincorporated	2	planned 922	Planned Unlined Bioretention	4.80	2.79	58%	0.007	0.124
Unincorporated	2	ROW 7003	ROW Opportunity	3.09	0.99	32%	0.009	0.116
Unincorporated	2	ROW 3884	ROW Opportunity	4.07	2.27	56%	0.007	0.098
Unincorporated	2	planned 910	Planned Unlined Bioretention	0.77	0.41	53%	0.030	0.098
Unincorporated	2	ROW 278	ROW Opportunity	8.71	4.86	56%	0.004	0.097
Unincorporated	2	planned 921	Planned Unlined Bioretention	3.60	2.10	58%	0.007	0.093
Unincorporated	2	planned 944	Planned Unlined Bioretention	7.39	1.26	17%	0.004	0.090
Unincorporated	2	ROW 15893	ROW Opportunity	2.97	1.65	56%	0.008	0.078
Unincorporated	2	ROW 7816	ROW Opportunity	1.63	0.34	21%	0.011	0.074
Unincorporated	2	planned 841	Planned Unlined Bioretention	2.18	1.80	83%	0.010	0.073
Unincorporated	2	planned 948	Planned Unlined Bioretention	2.32	1.60	69%	0.009	0.072
Unincorporated	2	planned 951	Planned Unlined Bioretention	2.22	1.53	69%	0.008	0.068
Unincorporated	2	planned 715	Planned Unlined Bioretention	4.86	2.45	50%	0.004	0.067
Unincorporated	2	ROW 9938	ROW Opportunity	0.86	0.53	62%	0.019	0.061
Unincorporated	2	Parcel 373409	Regional Opportunity	46.53	17.47	38%	0.001	0.061
Unincorporated	2	planned 1159	Planned Unlined Bioretention	2.41	1.29	54%	0.007	0.057
Unincorporated	2	planned 824	Planned Unlined Bioretention	2.98	1.31	44%	0.005	0.057
Unincorporated	2	Parcel 212559	Regional Opportunity	2.98	1.31	44%	0.005	0.057
Unincorporated	2	planned 1120	Planned Unlined Bioretention	2.72	1.22	45%	0.006	0.056
Unincorporated	2	planned 932	Planned Unlined Bioretention	1.95	1.27	65%	0.008	0.056
Unincorporated	2	Parcel 234658	Regional Opportunity	1.95	1.27	65%	0.008	0.056
Unincorporated	2	planned 1145	Planned Unlined Bioretention	1.80	1.30	72%	0.008	0.053

Contra Costa Countywide Attainment Strategy  
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Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Unincorporated	2	planned 950	Planned Unlined Bioretention	1.69	1.17	69%	0.008	0.052
Unincorporated	2	Parcel 238562	Regional Opportunity	12.03	6.43	53%	0.002	0.052
Unincorporated	2	Parcel 233114	Regional Opportunity	1.76	1.09	62%	0.008	0.050
Unincorporated	2	Parcel 227066	Regional Opportunity	1.84	0.99	54%	0.007	0.047
Unincorporated	2	planned 1234	Planned Unlined Bioretention	2.16	1.04	48%	0.006	0.046
Unincorporated	2	Parcel 183600	Regional Opportunity	2.16	1.04	48%	0.006	0.046
Unincorporated	2	ROW 8370	ROW Opportunity	3.43	2.12	62%	0.004	0.042
Unincorporated	2	planned 965	Planned Unlined Bioretention	6.89	2.96	43%	0.002	0.042
Unincorporated	2	planned 1291	Planned Unlined Bioretention	1.09	0.95	87%	0.011	0.041
Unincorporated	2	planned 949	Planned Unlined Bioretention	1.37	0.93	68%	0.008	0.041
Unincorporated	2	Parcel 227359	Regional Opportunity	1.61	0.86	53%	0.007	0.041
Unincorporated	2	ROW 17780	ROW Opportunity	2.96	1.24	42%	0.004	0.040
Unincorporated	2	planned 1160	Planned Unlined Bioretention	1.68	0.89	53%	0.007	0.040
Unincorporated	2	planned 18	Planned Lined Bioretention	1.52	0.87	57%	0.007	0.038
Unincorporated	2	ROW 10003	ROW Opportunity	1.69	0.37	22%	0.006	0.036
Unincorporated	2	planned 13	Planned Lined Bioretention	2.14	0.72	34%	0.005	0.035
Unincorporated	2	planned 1295	Planned Unlined Bioretention	1.25	0.75	60%	0.008	0.035
Unincorporated	2	ROW 18461	ROW Opportunity	1.29	0.56	43%	0.007	0.033
Unincorporated	2	planned 1161	Planned Unlined Bioretention	1.41	0.66	47%	0.006	0.032
Unincorporated	2	ROW 6054	ROW Opportunity	1.16	0.07	6%	0.006	0.030
Unincorporated	2	planned 829	Planned Unlined Bioretention	1.82	1.15	63%	0.005	0.030
Unincorporated	2	planned 927	Planned Unlined Bioretention	1.35	0.61	45%	0.006	0.030
Unincorporated	2	Parcel 218901	Regional Opportunity	1.82	1.15	63%	0.005	0.030
Unincorporated	2	planned 1138	Planned Unlined Bioretention	0.92	0.66	72%	0.009	0.029
Unincorporated	2	planned 1144	Planned Unlined Bioretention	0.89	0.65	73%	0.009	0.029
Unincorporated	2	planned 890	Planned Unlined Bioretention	1.14	0.66	58%	0.007	0.029
Unincorporated	2	Parcel 40021	Regional Opportunity	17.61	7.00	40%	0.001	0.029
Unincorporated	2	Parcel 251699	Regional Opportunity	1.25	0.63	50%	0.007	0.029
Unincorporated	2	planned 818	Planned Unlined Bioretention	1.37	0.61	45%	0.006	0.028
Unincorporated	2	planned 714	Planned Unlined Bioretention	18.57	6.68	36%	0.001	0.028
Unincorporated	2	ROW 302	ROW Opportunity	4.48	2.58	58%	0.002	0.027
Unincorporated	2	planned 1252	Planned Unlined Bioretention	0.14	0.10	71%	0.043	0.024
Unincorporated	2	planned 955	Planned Unlined Bioretention	0.82	0.54	66%	0.008	0.024
Unincorporated	2	planned 1132	Planned Unlined Bioretention	1.16	0.53	46%	0.006	0.024
Unincorporated	2	planned 947	Planned Unlined Bioretention	0.86	0.49	57%	0.008	0.023
Unincorporated	2	planned 1249	Planned Unlined Bioretention	8.27	3.84	46%	0.001	0.023
Unincorporated	2	Parcel 11752	Regional Opportunity	10.67	2.59	24%	0.001	0.023
Unincorporated	2	Parcel 225283	Regional Opportunity	10.44	5.50	53%	0.001	0.023
Unincorporated	2	planned 1297	Planned Unlined Bioretention	0.62	0.12	19%	0.010	0.021
Unincorporated	2	planned 843	Planned Unlined Bioretention	0.97	0.44	45%	0.006	0.020
Unincorporated	2	planned 19	Planned Lined Bioretention	0.94	0.40	43%	0.006	0.019
Unincorporated	2	planned 926	Planned Unlined Bioretention	0.85	0.39	46%	0.006	0.019
Unincorporated	2	planned 1188	Planned Unlined Bioretention	2.05	0.21	10%	0.003	0.019
Unincorporated	2	planned 1056	Planned Unlined Bioretention	2.73	1.12	41%	0.003	0.019
Unincorporated	2	planned 1148	Planned Unlined Bioretention	0.57	0.42	74%	0.009	0.018
Unincorporated	2	planned 1248	Planned Unlined Bioretention	2.81	1.39	49%	0.002	0.018
Unincorporated	2	Parcel 190589	Regional Opportunity	7.24	4.65	64%	0.001	0.018
Unincorporated	2	Parcel 190676	Regional Opportunity	2.81	1.39	49%	0.002	0.018
Unincorporated	2	planned 825	Planned Unlined Bioretention	0.70	0.38	54%	0.007	0.017
Unincorporated	2	planned 854	Planned Unlined Bioretention	0.73	0.37	51%	0.006	0.017
Unincorporated	2	Parcel 211551	Regional Opportunity	0.70	0.38	54%	0.007	0.017
Unincorporated	2	Parcel 134621	Regional Opportunity	5.52	4.38	79%	0.001	0.017
Unincorporated	2	Parcel 18653	Regional Opportunity	10.01	4.18	42%	0.001	0.017
Unincorporated	2	Parcel 260347	Regional Opportunity	13.69	3.71	27%	0.001	0.017
Unincorporated	2	Parcel 248771	Regional Opportunity	8.72	4.17	48%	0.001	0.017
Unincorporated	2	planned 1232	Planned Unlined Bioretention	0.67	0.37	55%	0.007	0.016
Unincorporated	2	planned 827	Planned Unlined Bioretention	0.82	0.32	39%	0.005	0.016
Unincorporated	2	planned 1099	Planned Unlined Bioretention	7.57	4.06	54%	0.001	0.016
Unincorporated	2	planned 817	Planned Unlined Bioretention	9.30	3.93	42%	0.001	0.016
Unincorporated	2	Parcel 214683	Regional Opportunity	0.82	0.32	39%	0.005	0.016
Unincorporated	2	Parcel 261278	Regional Opportunity	7.57	4.06	54%	0.001	0.016
Unincorporated	2	Parcel 234760	Regional Opportunity	10.17	3.71	36%	0.001	0.016
Unincorporated	2	Parcel 185725	Regional Opportunity	0.67	0.37	55%	0.007	0.016
Unincorporated	2	Parcel 204352	Regional Opportunity	0.50	0.37	74%	0.010	0.016
Unincorporated	2	Parcel 363962	Regional Opportunity	8.03	3.75	47%	0.001	0.016
Unincorporated	2	planned 820	Planned Unlined Bioretention	0.59	0.34	58%	0.007	0.015
Unincorporated	2	planned 1047	Planned Unlined Bioretention	4.54	1.79	39%	0.002	0.015
Unincorporated	2	Parcel 259820	Regional Opportunity	8.72	3.46	40%	0.001	0.015
Unincorporated	2	Parcel 221126	Regional Opportunity	7.83	3.50	45%	0.001	0.015
Unincorporated	2	Parcel 373937	Regional Opportunity	9.10	4.03	44%	0.001	0.015
Unincorporated	2	planned 838	Planned Unlined Bioretention	0.51	0.35	69%	0.008	0.014
Unincorporated	2	Parcel 25124	Regional Opportunity	10.84	2.77	26%	0.001	0.014
Unincorporated	2	Parcel 262723	Regional Opportunity	10.53	3.23	31%	0.001	0.014
Unincorporated	2	Parcel 260232	Regional Opportunity	0.64	0.31	48%	0.006	0.014
Unincorporated	2	Parcel 236835	Regional Opportunity	11.70	2.62	22%	0.001	0.014
Unincorporated	2	ROW 19675	ROW Opportunity	4.36	2.48	57%	0.001	0.013
Unincorporated	2	planned 905	Planned Unlined Bioretention	0.92	0.52	57%	0.004	0.013
Unincorporated	2	planned 1065	Planned Unlined Bioretention	7.95	2.46	31%	0.001	0.013
Unincorporated	2	Parcel 180679	Regional Opportunity	0.58	0.29	50%	0.007	0.013
Unincorporated	2	Parcel 368650	Regional Opportunity	7.51	3.18	42%	0.001	0.013
Unincorporated	2	planned 1231	Planned Unlined Bioretention	0.53	0.28	53%	0.007	0.012
Unincorporated	2	Parcel 186716	Regional Opportunity	0.53	0.28	53%	0.007	0.012
Unincorporated	2	Parcel 373408	Regional Opportunity	12.02	4.26	35%	0.000	0.012
Unincorporated	2	ROW 10414	ROW Opportunity	5.41	0.94	17%	0.001	0.011
Unincorporated	2	ROW 14235	ROW Opportunity	1.05	0.63	60%	0.004	0.011
Unincorporated	2	planned 1134	Planned Unlined Bioretention	0.23	0.11	48%	0.012	0.011
Unincorporated	2	planned 1281	Planned Unlined Bioretention	0.34	0.25	74%	0.010	0.011
Unincorporated	2	planned 953	Planned Unlined Bioretention	0.38	0.06	16%	0.008	0.011
Unincorporated	2	planned 839	Planned Unlined Bioretention	0.41	0.29	71%	0.008	0.011
Unincorporated	2	planned 909	Planned Unlined Bioretention	1.48	0.76	51%	0.003	0.011
Unincorporated	2	planned 1026	Planned Unlined Bioretention	7.74	2.72	35%	0.001	0.011
Unincorporated	2	Parcel 20770	Regional Opportunity	7.74	2.72	35%	0.001	0.011
Unincorporated	2	Parcel 234439	Parcel-Based Opportunity	0.38	0.25	66%	0.009	0.011
Unincorporated	2	planned 1176	Planned Unlined Bioretention	0.40	0.23	58%	0.008	0.010

Contra Costa Countywide Attainment Strategy  
 Attachment 1: Countywide Attainment Scenario Model Results

Jurisdiction	Permit	Project ID	Project Type	Area (Acres)	Impervious Area (Acres)	Percent Impervious	PCBs Yield (g/acre)	PCBs Mass reduced (g/yr)
Unincorporated	2	planned 1029	Planned Unlined Bioretention	0.89	0.19	21%	0.003	0.010
Unincorporated	2	planned 1055	Planned Unlined Bioretention	2.12	1.35	64%	0.002	0.010
Unincorporated	2	planned 1101	Planned Unlined Bioretention	5.42	2.20	41%	0.001	0.010
Unincorporated	2	planned 1049	Planned Unlined Bioretention	5.32	1.53	29%	0.001	0.010
Unincorporated	2	planned 842	Planned Unlined Bioretention	4.76	2.42	51%	0.001	0.010
Unincorporated	2	Parcel 244216	Regional Opportunity	2.77	1.14	41%	0.002	0.010
Unincorporated	2	Parcel 222704	Regional Opportunity	4.35	2.44	56%	0.001	0.010
Walnut Creek	2	ROW 13263	ROW Opportunity	1.31	0.40	31%	0.019	0.104



**APPENDIX C**

**ROADMAP OF FUNDING SOLUTIONS  
FOR SUSTAINABLE STREETS**

# ROADMAP OF FUNDING SOLUTIONS FOR SUSTAINABLE STREETS



Prepared by the  
Bay Area Stormwater Management Agencies Association  
for the Urban Greening Bay Area Initiative  
Final April 26, 2018





## Credits

This Roadmap of Funding Solutions for Sustainable Streets was prepared as part of the Regional Roundtable on Sustainable Streets led by the Bay Area Stormwater Management Agencies Association (BASMAA) with grant funding from the US Environmental Protection Agency's San Francisco Bay Water Quality Improvement Fund, as part of the Urban Greening Bay Area initiative managed by the San Francisco Estuary Partnership.

BASMAA wishes to acknowledge the following individuals, agencies and firms that developed the Roadmap:

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This Roadmap incorporates input provided by attendees of the September 19, 2017, Regional Roundtable, as identified in Appendix G, List of Participating Agencies and Organizations.

### **Photo and Image Credits**

Several images included in the Roadmap were provided the San Mateo Countywide Water Pollution Prevention Program (SMCWPPP) or by the following consultants to SMCWPPP, Nevue Ngan Associates and Bottomley Urban Design.

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- B: Potential Sources of Funding for Sustainable Streets
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## Executive Summary

This report, the Roadmap, was developed to identify and remedy obstacles to funding for Sustainable Street projects, which are defined as **projects that include both Complete Street improvements and green stormwater infrastructure, and that are maintained in a state of good or fair condition.**

The specific actions included in this Roadmap are designed to improve the capacity – both statewide and in the San Francisco Bay Area -- to fund Sustainable Street projects that support compliance with regional permit requirements to reduce pollutant loading to San Francisco Bay, while also helping to achieve the region’s greenhouse gas reduction targets.



*Sustainable Street in the City of San Mateo; stormwater runoff flows into a “bioretention area” or rain garden that reduces the crossing length for pedestrians near a local school (Source: SMCWPPP).*

### Challenges for Sustainable Streets

To date, Sustainable Streets have faced funding obstacles due to the restrictions of various funding programs – which may not recognize the potential for overall cost savings that local agencies may achieve through multi-benefit Sustainable Streets projects. Some transportation grants may fund only some aspects of a Sustainable Street project, while resource grants may fund other aspects – and assembling multiple funding sources brings new challenges and costs to a project.

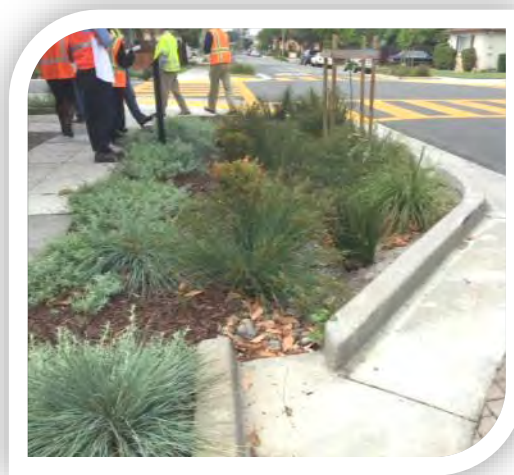
### Financial Needs and Benefits

Over the next 20 to 30 years, cities throughout the Bay Area, and in other parts of California, are required to invest in widespread construction of infrastructure projects that remove pollutants from stormwater runoff, in order to achieve water quality goals for San Francisco Bay. The cost is anticipated to parallel the costs to meet similar requirements in other parts of the state. For example, City of Los Angeles alone, over the next 20 to 30 years, has estimated that \$7 to \$9 billion dollars will be needed to implement the city’s Water Quality Compliance Master Plan for Urban Runoff (Farfing and Watson 2014). Sustainable Streets are designed to cost effectively deliver multiple benefits, including: climate change mitigation, air quality improvement, water quality improvement, localized flood control, and community benefits.

## Specific Actions to Address Challenges

This Roadmap presents specific actions intended to ease the financial burden local governments are facing by maximizing available resources and/or identifying new funding streams. The specific actions to fund Sustainable Streets are scheduled for the following timeframes:

- **Immediate actions**, such as addressing Sustainable Streets in grant solicitations
- **Short-term actions**, such as reviewing policies for better ways to fund Sustainable Streets
- **Long-term solutions**, including legislative engagement and/or advocacy regarding Sustainable Street



*This Sustainable Street project in Union City incorporates a bioretention area and pervious paving with curb extensions (Source: Horizon).*

## How You Can Help

Public agencies that fund transportation, water, and climate change mitigation and adaptation investments are collaborating to implement specific actions related to their funding programs. Implementation agencies and non-governmental organizations (NGOs) are leading additional specific actions to fund Sustainable Streets, including legislative engagement and/or advocacy. A Roadmap Committee will continue to provide support throughout the implementation of the Roadmap, to spread the word about successes achieved when there is investment in these recommended actions.

A sample of specific actions to fund Sustainable Streets is provided below:

Specific Action No.	Description	Lead Entity	Support Entity(ies)
1-2	<b>Update One Bay Area Grant Guidance</b> - Develop guidance clarifying eligibility of green stormwater infrastructure (GSI) elements in federally funded (One Bay Area Grant - OBAG) transportation projects, for inclusion in guidance materials that MTC will provide county's for OBAG's third round of funding.	Metropolitan Transportation Commission (MTC)	Caltrans
1-4	<b>Identify Opportunities to More Fully Fund Sustainable Streets</b> - Each identified agency will review policy documents for its applicable grant program(s) to identify opportunities to more fully fund Sustainable Streets projects, using a checklist provided in Appendix D.	Funding agencies identified on page 7	None
1-7	<b>Develop State Legislative Program</b> - Develop and implement an initiative to inform and/or influence future state propositions, related legislation and incorporation into state law – that provides a clear path for full eligibility of Sustainable Streets, and coordinates application requirements among grant programs that fund Sustainable Streets.	San Francisco Estuary Partnership	BASMAA, State Water Board, Regional Water Board Trust for Public Land, Save the Bay



# 1. Purpose and Need

## Funding Sustainable Streets

The purpose of this Roadmap is to identify specific actions to fund Sustainable Street projects, which are defined as **projects that include both Complete Streets improvements and green stormwater infrastructure, such as rain gardens and pervious paving, and that are maintained in a state of good or fair condition**, based on the Good-to-Poor rating system adopted by the California Transportation Commission (Caltrans 2016). The funding of Sustainable Streets projects has proven challenging, due to the tendency for various funding programs to focus only on one or a few of the multiple benefits provided by Sustainable Streets.

Investments in Sustainable Streets will help meet needs for stormwater permit compliance, greenhouse gas (GHG) reduction, and road maintenance. Sustainable Streets support stormwater compliance, by addressing the water quality impacts of cars and trucks, the fact that stormwater runoff from adjacent properties is often routed to roadways, and the integration of storm drain systems into streets and roads. Sustainable Streets sequester carbon and encourage alternative modes of travel, supporting the San Francisco Bay Area’s GHG reduction targets. Sustainable Streets can help maintain roadways in good or fair condition, which is important for maintaining the safety of the traveling public, and has been challenging, as gas tax revenues have declined, due to improved vehicle efficiency and efforts to reduce single occupancy vehicle travel. It may be possible to achieve economies of scale by including active transportation, pavement rehabilitation, and water grant funding to fully fund a Sustainable Streets project.

This Roadmap is an output of a Regional Roundtable process that convened meetings of representatives from federal, state, regional, and local agencies to identify and seek to resolve obstacles to funding Sustainable Streets projects. The specific actions for funding Sustainable Streets listed in Section 2 are based primarily on information presented at meetings of the Regional Roundtable. Agencies and organizations participating in the Regional Roundtable were provided an opportunity to review and comment on the Roadmap. There is a close correspondence between the agencies and organizations participating in the Roadmap and the Regional Roundtable. More information on the Regional Roundtable is available at <http://www.sfestuary.org/urban-greening-bay-area/#planning>.



*This Sustainable Street in City of San Mateo incorporates a bicycle lane and a “bioretention area” or rain garden that removes pollutants from stormwater runoff (Source: SMCWPPP).*



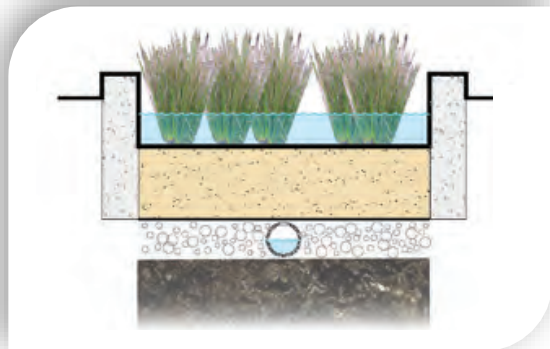
## Financial Needs and Benefits

Municipalities throughout the Bay Area are required to change the way they manage stormwater runoff, due to green infrastructure planning requirements in the Municipal Regional Stormwater Permit (San Francisco Bay Regional Water Quality Control Board 2015), as well as green infrastructure components of the San Francisco Public Utilities Commission's 20-year Sewer System Improvement Program (SFPUC 2017). These planning processes call for a transition from traditional "gray" infrastructure to an increase in green stormwater infrastructure, in order to improve water quality in San Francisco Bay over the coming decades.



*Green stormwater infrastructure is designed to mimic natural processes. This photo shows how landscaped bioretention areas help to detain and slow the flow of stormwater runoff to the storm drain system (Source: Nevue Ngan).*

The cost is anticipated to parallel costs to meet similar requirements in Southern California. The City of Los Angeles alone, over the next 20 to 30 years, estimated \$7 to \$9 billion will be needed to implement the city's Water Quality Compliance Master Plan for Urban Runoff (Farfing and Watson 2014).

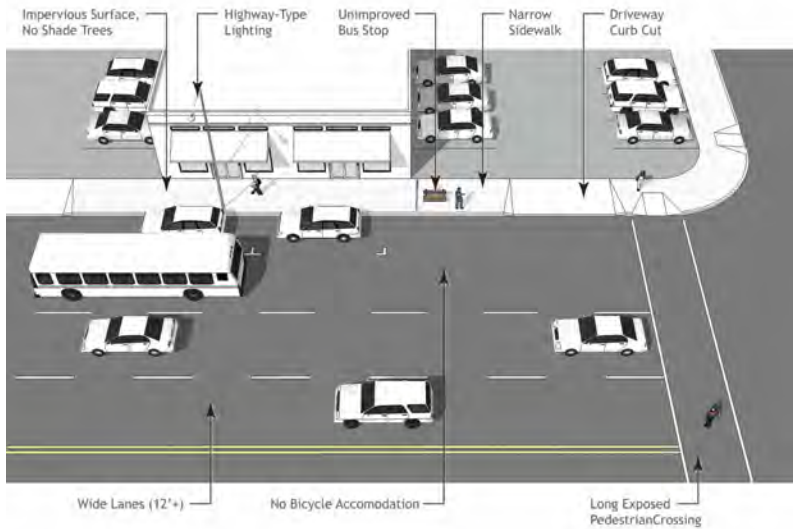


*Cut-away view of a bioretention area. Natural processes remove pollutants from stormwater runoff as it filters through biotreatment soil. Some of the treated water will infiltrate into native soils; some will enter the underdrain and go to the storm drain*

Union City prepared a preliminary capital cost estimate in the range of \$72 million to \$126 million, in 2017 dollars, to implement GSI in accordance with the estimated local share of mercury and PCB pollutant load reduction targets (Ruark 2017). With a population of 72,155 and geographical area of 19.3 square miles, representing just 1.5 percent of the Bay Area's urbanized land, Union City's GSI program represents a small percentage of the anticipated capital investments that will be needed from the 76 local agencies subject to the Municipal Regional Stormwater Permit to comply with the GSI planning requirements. Efforts to further quantify the need for investment in GI are currently underway as part of developing jurisdiction-specific GI Plans.

In the coming decades, state and regional transportation agencies are seeking to mitigate climate change and improve mobility in the Bay Area through large-scale funding of transportation projects that emphasize bicycle, pedestrian, and public transit facilities. The Transportation Investment Strategy of the Draft Plan Bay Area 2040 anticipates over \$5 billion in funding for complete streets and active transportation projects over the next 24 years (MTC 2017d). The following sequence of three images shows how Complete Streets plus GSI equal Sustainable Streets.

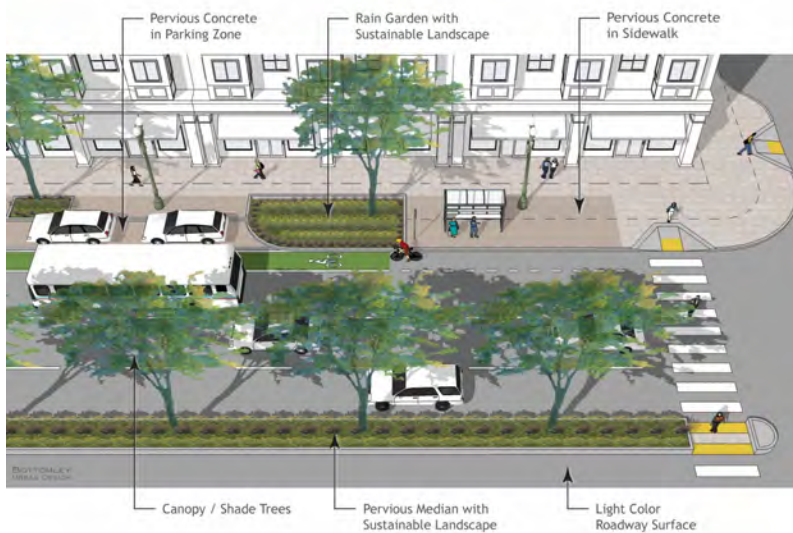
# Roadmap of Funding Solutions for Sustainable Streets



*Conventional Street*



*Complete Street*



*Complete Street  
+  
Green Infrastructure  
=  
Sustainable Street*

*Source: Bottomley Urban Design*

Sustainable Streets are designed to cost effectively deliver multiple benefits, including:

- **Climate change mitigation** – Sustainable street designs encourage bicycling, walking, and the use of public transportation to help reduce carbon emissions from motor vehicles. Trees and landscaping are planted to sequester carbon.
- **Air quality improvement** – By encouraging bicycling, walking, and the use of public transportation, Sustainable Streets can help reduce particulate matter and other pollutants from motor vehicles that can adversely affect human health.
- **Water quality improvement** – Pollutants in stormwater runoff are removed by capturing and treating stormwater in specially designed landscape areas.
- **Localized flood control** – Directing stormwater runoff to landscaping can help address local flooding problems.
- **Water supply reliability** – In areas that rely on groundwater supplies, directing stormwater runoff to landscaping can help support water supply reliability by recharging groundwater.
- **Community benefits** – Planting trees and landscaping enhances public spaces, which can increase property values and improve community cohesiveness, improving quality of life and better accommodating an increasing number of Bay Area residents.
- **Public health** – Construction of bicycle and pedestrian facilities encourages active living.
- **Climate change adaptation** – Green infrastructure designs can help improve the resilience of transportation infrastructure to withstand high intensity storms and rising sea levels.

### Challenges to Funding Sustainable Streets

Because each funding programs has historically focused on only one or a few of the multiple benefits provided by Sustainable Streets, local agencies have encountered challenges in funding Sustainable Streets projects including:

- **Ineligible components of Sustainable Streets projects:** Green infrastructure may be ineligible for funding by transportation grants; transportation facilities may be ineligible for funding by resource agency grants.
- **Ineligible activities:** Some grants may not cover all project phases, such as planning or short-term maintenance.
- **Inability to use other grants as matching funds:** Matching funds must cover eligible activities; therefore, grant funding for GSI components of a Sustainable Street project may not “count” as a match for a transportation grant, and vice versa.
- **Funding cycles of grants are not coordinated:** Projects that must assemble funding from multiple grants may have difficulty finding two applicable grants that will be available at the same time.

- **Costs of tracking and applying for grants:** Local agencies often lack the resources to track grant opportunities, prepare applications, and “repackage” the same project to apply for multiple grants.
- **Costs of administering and reporting on grants:** Obtaining multiple grants for a single project adds substantial administrative requirements due to separate record-keeping and reporting.
- **Scoring approaches may penalize multiple-benefit projects:** Sustainable Streets projects may not score competitively for grants that seek the most cost-effective transportation solution, due to the inclusion of ineligible costs.

**Case Studies: Opportunities to Improve Funding of Sustainable Streets**

At the Regional Roundtable meeting on May 23, 2017, two case studies were presented, identifying opportunities to improve funding of Sustainable Streets under the Metropolitan Transportation Committee’s One Bay Area Grant (OBAG) program and the State Water Resources Control Board’s Storm Water Grant Program (SWGP). These case studies led to the development of several Specific Actions included in the Roadmap. Appendix E presents the results of the review of policy documents for these grant programs, using a checklist format.

This Roadmap has been developed to address these challenges, in order to achieve funding of Sustainable Streets projects.

## 2. Specific Actions

This section of the Roadmap identifies Specific Actions for implementation by federal, state, regional, and local agencies – including agencies in the water resources and transportation sectors – to improve conditions for funding Sustainable Street projects. All agencies face certain limitations in their roles. For example, transportation agencies are subject to various requirements to specifically focus on addressing transportation needs, while water resource agencies must address their own legislative mandates. The Specific Actions described below seek to maximize collaboration across sectors, as possible given the limitations of the respective agencies' roles.

### Categories and Timeframes for Specific Actions

The Roadmap includes three pathways, based on three categories of specific actions to fund Sustainable Streets, as follows:

- Pathway 1, Prioritize Sustainable Streets in Funding Sources
- Pathway 2, Improve Conditions for Projects that Are Funded by Multiple Grants
- Pathway 3, Additional Funding Options

Each specific action will be conducted by a lead entity, and, in some cases, supporting entities. The specific actions included in each pathway are organized by timeframe (immediate, short-term, and long-term). Some of the Specific Actions have statewide implications, and some have potential to involve Integrated Regional Water Management groups. Therefore, the Roadmap Committee may coordinate some Specific Actions with applicable provisions of the California Water Action Plan, and the Committee may recommend reaching out to local agencies from other regions and/or IRWM groups to collaborate on some Specific Actions. The Roadmap Committee may also identify needs for workgroups to implement various Specific Actions. Immediate tasks are anticipated to be initiated in 2018, and are likely to conclude in 2019. Short-term tasks are anticipated to be initiated in 2019, and are likely to conclude in 2020. Long-term tasks may begin as early as 2019 and are likely to continue for a period of years. Within each timeframe, actions are alphabetized by lead entity name.

### Pathway 1: Prioritize Sustainable Streets in Funding Sources

Pathway 1 seeks to prioritize Sustainable Street project activities in funding sources managed by both transportation and resource agencies. The goal of this pathway is to maximize the ability of each funding source to fund both transportation and green stormwater infrastructure improvements -- reflecting the integration of transportation and resource benefits in Sustainable Streets.

Table 1 lists specific actions and participation by agencies and organizations to prioritize Sustainable Streets in funding sources. A number of the actions are specific to the State Water Resources Control Board's Storm Water Grant Program (SWGP) and the Metropolitan Transportation Commission's One Bay Area Grant Program (OBAG), based on case studies that were prepared for these programs as part of the Regional Roundtable on Sustainable Streets. Other funding agencies will conduct similar reviews of applicable grant programs, under Specific Action 1-4.



Specific Action 1-7, Develop State Legislative Program, does not specify particular legislative initiatives, which will be identified as part of this Specific Action. The State Legislative Program may recommend requirements for interagency collaboration and/or participation by key agencies in actions that promote widespread implementation of Sustainable Streets, recognizing that requirements have been needed for interagency collaboration such as the Integrated Regional Water Management program. The State Legislative Program may also review other Specific Actions, and recommendations that emerge from Specific Actions, to identify items that would be best implemented through legislation.

Table 1 Specific Actions to Prioritize Sustainable Streets in Funding Sources			
Specific Action No.	Entities Lead Support		Description of Action
<b>Immediate Actions</b>			
1-1	Caltrans Local Assist.	FHWA MTC	<b>Clarify GSI Eligibility in Federal Transportation Grants</b> - Provide clarification of the eligibility of GSI elements in federally funded transportation projects.
1-2	MTC	Caltrans Div. of Local Assist.	<b>Update OBAG Guidance</b> - Develop guidance clarifying eligibility of GSI elements in federally funded (One Bay Area Grant - OBAG) transportation projects, for inclusion in guidance materials that MTC will provide to counties for OBAG's third round of funding.
1-3	California Transportation Commission	Caltrans, MTC	<b>Clarify GSI Eligibility in the Local Streets and Roads Program</b> – As guidelines are developed for this program, in accordance with SB 1 of 2017, clarify the eligibility of GSI elements in pavement rehabilitation and other applicable projects.
<b>Short-Term Actions</b>			
1-4	Applicable funding agencies <sup>1</sup>	--	<b>Identify Opportunities to More Fully Fund Sustainable Streets</b> - Each identified agency will review policy documents for its applicable grant program(s) to identify opportunities to more fully fund Sustainable Streets projects, using a checklist provided in Appendix D.
1-5	Regional Water Board staff	BASMAA, countywide stormwater programs	<b>Regional Water Board Staff to Review the Completed Checklists Prepared in Specific Action 1-4.</b> Water Board staff will identify opportunities to more fully fund Sustainable Streets. The purpose of this review would be to help funding agencies identify opportunities to further support GI implementation. This review of the completed checklists will provide an opportunity to suggest changes to eligibility requirements, potentially including modifications that would make it easier for small agencies to obtain funding for GI.

<sup>1</sup> **Agencies implementing Action 1-4**

ACTC, CCTA, SMCTA, VTA  
 ACTC, C/CAG, CCTA, VTA  
 BAAQMD  
 Caltrans  
 CNRA  
 DWR, SCC  
 FEMA  
 SFBRA, SCC  
 SGC

**Applicable grant programs**

Transportation half-cent sales tax measure programs  
 Congestion Management Agency programs  
 Transportation Fund for Clean Air  
 Active Transportation Program, Cooperative Implementation Agreements  
 Urban Greening grants  
 Proposition 1 grants  
 Emergency Management Performance Grant  
 Measure AA Program  
 Affordable Housing and Sustainable Communities Program

Table 1 Specific Actions to Prioritize Sustainable Streets in Funding Sources			
Specific Action No.	Entities Lead Support		Description of Action
<b>Actions to Achieve Long-Term Solutions</b>			
1-6	BASMAA	SFEP, TPL, SFBRWQCB	<b>Identify Opportunities to Influence Federal Policy</b> - Identify opportunities to support efforts by others to influence eligibility of GSI in federal surface transportation programs, maintaining communication with MTC on legislative engagement and/or advocacy.
1-7	SFEP <sup>2</sup>	State Water Board, RWQCB BASMAA, TPL, STB	<p><b>Develop State Legislative Program</b> - Develop and implement a strategy to inform and/or influence future state propositions, related legislation, and incorporation into state law – that provides a clear path for full eligibility of Sustainable Streets, and coordinates application requirements among grant programs that fund Sustainable Streets. This is anticipated to include reports to legislators about the types of designs and co-benefits (including green jobs) that resonate with communities. Topics to consider incorporating into the State Legislative Program include:</p> <ul style="list-style-type: none"> <li>• Recommendations regarding bond measures, language about match and eligibility, and other issues that were discussed in case studies presented at Roundtable meeting -- which may include tracking the funding for a future iteration of the Storm Water Grant Program (after Prop 1 is complete) and participating in the stakeholder outreach workshops.</li> <li>• Requirements for interagency collaboration and/or for participation by key agencies in actions that promote widespread implementation of Sustainable Streets.</li> <li>• Review other Specific Actions and recommendations that emerge from Specific Actions, in order to identify items that would be best implemented through legislation.</li> </ul> <p>To help demonstrate the need for legislative fixes, potentially identify the ideal state to modernize roadways, and then compare that effort to the effort needed to maintain the facilities that we have now.</p>
1-8	Caltrans stormwater staff	State Water Board staff, Regional Water Board staff	<b>Address Caltrans Stormwater Treatment Credit</b> - Prepare proposal for providing credit to Caltrans for GI that is funded as part of Caltrans' transportation grants to local agencies.

### Pathway 2: Improve Conditions for Using Multiple Grants

Pathway 2 seeks to improve conditions for projects that are funded with multiple grants. The goal of Pathway 2 is to remove obstacles that local agencies have encountered when attempting to obtain and manage multiple grants for a single Sustainable Streets project. The specific actions for this pathway are listed in Table 2.

<sup>2</sup> The legislative work done by public agencies would consist of educating lawmakers on issues and opportunities.

Table 2 Specific Actions to Improve Conditions for Using Multiple Grants			
Specific Action No.	Entities Lead Support		Description of Action
<b>Immediate Actions</b>			
2-1	SWRCB	Other funding agencies	<b>Coordinate to Publicize Solicitations</b> - Coordinate with other agencies to join SWRCB in participating in funding fairs and the California Financing Coordinating Committee website.
2-2	Applicable funding agencies <sup>3</sup>	--	<b>Inform other agencies of solicitations</b> - Identify and add staff from applicable agencies to the list of parties to notify regarding schedules of future solicitations for applicable grant programs.
<b>Short-Term Actions</b>			
2-3	BASMAA	Funding agencies, SFBRWQCB	<p><b>Offer Training on Obtaining Grants</b> - Develop and offer training to assist local agencies in the San Francisco Bay Area in identifying funding sources and preparing grant applications for Sustainable Streets projects, seeking to help local agencies build capacity to be able to apply for grants and follow through with the requirements for project planning, public involvement, tracking of results, and funding of maintenance. This will include consideration how to address the needs of disadvantaged communities. Examples of grants to address include Caltrans' Cooperative Implementation Program and Financial Contribution Only Program. Potentially include in the training:</p> <ul style="list-style-type: none"> <li>• Nuts and bolts of obtaining funding,</li> <li>• How to gauge the competitiveness of a project and be strategic in efforts to seek funding,</li> <li>• How to find the flexibility in a funding program and tailor the applications accordingly,</li> <li>• Case studies of how cities have succeeded in winning grants and keeping the grant funds that they won – especially when there were multiple sources of funding.</li> </ul> <p>(Note: this action also applies to Pathway 1, Prioritize Sustainable Streets in Funding Sources.)</p>

<sup>3</sup> **Agencies implementing Action 2-2**

ACTC, CCTA, SMCTA, VTA  
 ACTC, C/CAG, CCTA, VTA  
 BAAQMD  
 Caltrans  
 CNRA  
 DWR, SCC  
 FEMA  
 MTC  
 SFBRA, SCC  
 SGC  
 SWRCB

**Applicable grant programs**

Transportation half-cent sales tax measure programs  
 Congestion Management Agency programs  
 Transportation Fund for Clean Air  
 Active Transportation Program, Cooperative Implementation Agreements  
 Urban Greening grants  
 Proposition 1 grants  
 Emergency Management Performance Grant  
 One Bay Area Grants  
 Measure AA Program  
 Affordable Housing and Sustainable Communities Program  
 Storm Water Grant Program



Table 2 Specific Actions to Improve Conditions for Using Multiple Grants			
Specific Action No.	Entities Lead Support		Description of Action
2-4	BASMAA	Funding agencies, CASQA	<p><b>Prepare Guidance for Packaging Projects</b> - Prepare statewide guidance on how to “package” Sustainable Streets projects for specific grants, which may be incorporated in future grant guidelines and will consider the needs of disadvantaged communities. Examples of grants to address include in the guidance encompass Caltrans’ Cooperative Implementation Program and Financial Contribution Only Program. Potentially include in the training:</p> <ul style="list-style-type: none"> <li>• Information on coordination, match requirements of different grants, how to demonstrate multiple benefits of GSI components in transportation projects,</li> <li>• Successful strategies to seek funding,</li> <li>• Guidance on how GI can be considered functional landscaping per Caltrans definitions, and</li> <li>• Recommendations from funding agencies on how to find the flexibility in the programs they are applying for and tailor applications to meet the requirements identified in the grant solicitation.</li> </ul> <p>(Note: this action also applies to Pathway 1, Prioritize Sustainable Streets in Funding Sources.)</p>
2-5	SFEP	BASMAA	<p><b>Track Upcoming Solicitations</b> - Develop and maintain a database to track upcoming solicitations for grants and applicable loans, such as the State Revolving Fund, that fund Sustainable Streets.</p>
2-6	SFEP	Funding agencies, BASMAA	<p><b>Identify Opportunities to Coordinate Reporting</b> - Compare reporting requirements among grant programs and identify opportunities to coordinate reporting schedule, format, etc. – for example, SWRCB allows grant recipients to establish some milestone dates.</p>
Actions to Achieve Long-Term Solutions			
2-7	Applicable funding agencies <sup>4</sup>	--	<p><b>Consider Linkages to Other Programs</b> - Funding agencies will consider aspects of other related grant programs (timing, criteria, etc.) in the development of future grant programs, and will coordinate with other grant programs where feasible.</p>

<sup>4</sup> **Agencies implementing Action 2-7**

ACTC, CCTA, SMCTA, VTA  
 ACTC, C/CAG, CCTA, VTA  
 BAAQMD  
 Caltrans  
 CNRA  
 DWR, SCC  
 FEMA  
 MTC  
 SFBRA, SCC  
 SGC  
 SWRCB

**Applicable grant programs**

Transportation half-cent sales tax measure programs  
 Congestion Management Agency programs  
 Transportation Fund for Clean Air  
 Active Transportation Program, Cooperative Implementation Agreements  
 Urban Greening grants  
 Proposition 1 grants  
 Emergency Management Performance Grant  
 One Bay Area Grants  
 Measure AA Program  
 Affordable Housing and Sustainable Communities Program  
 Storm Water Grant Program

### Pathway 3: Additional Funding Options

Pathway 3, Additional Funding Options, seeks to improve conditions for local agencies to fund Sustainable Streets projects with a range of funding options, including fees and loans, and the funding of pavement rehabilitation projects, through sources identified in Senate Bill 1 (SB 1), the Road Repair and Accountability Act of 2017, which was signed into law on April 28, 2017. SB 1 includes the continuous appropriation of \$1.5 billion annually for maintenance and rehabilitation of local streets and roads through various sources of revenue, such as increases in the State gasoline and diesel fuel taxes, and a new a transportation improvement fee to be collected with vehicle registration fees (League of California Cities 2017). The goal of Pathway 3 is to secure local funding mechanisms such as parcel taxes or fees for planning, implementation, and operations & maintenance of Sustainable Streets. It may be more cost-effective in the long run to fund ongoing costs through parcel taxes or fees than to expend staff time pursuing grants and loans to cover these costs. Although it is difficult to achieve the super-majority required by Proposition 218 to enact a stormwater fee, there are examples of successful ballot measures, including the 2017 approval of a fee in Palo Alto to fund routine water system maintenance and operation that provides for storm water system improvements (City of Palo Alto 2017), and the 2009 approval of a fee in Burlingame to fund a \$39 million Capital Improvement Program to improve the City's storm drain system (City of Burlingame 2015). Funds from parcel taxes or fees would help leverage grant opportunities as a reliable local match.

**Table 3**  
**Specific Actions for Additional Funding Options**

Specific Action No.	Entities Lead Support		Description of Action
<b>Immediate Actions</b>			
3-1	ACCWP, CCCWP, SMCWPPP, SCVURPPP	BASMAA	<b>Provide Guidance on a Range of Funding Options</b> – Countywide stormwater programs will provide guidance for local agencies to evaluate a range of funding options for Sustainable Streets projects and other projects that incorporate green stormwater infrastructure. This is anticipated to include an evaluation of Business Improvement Districts, approaches to fund maintenance including fees, and working with BASMAA to explore potential opportunities to develop a regional alternative compliance program.
3-2	SFEP	BASMAA	<b>Improve the Existing Web Presence for the Roadmap.</b> Expand the existing Green Stormwater Infrastructure Resources of SFEP’s website to help publicize the Roadmap, or potentially develop a new website for the Roadmap. This will include the management of an online spreadsheet of Specific Actions to monitor progress of Roadmap implementation.
3-3	SFEP	BASMAA	<b>Seek Funding for Roadmap Implementation.</b> Identify potential funding sources and submit applications for a grant to cover expenses for state legislative program development website development and maintenance, annual meetings of the Roadmap Committee, training on obtaining grants, development of guidance for obtaining multiple grants, and tracking implementation of Specific Actions.

**Table 3**  
**Specific Actions for Additional Funding Options**

Specific Action No.	Entities Lead Support		Description of Action
3-4	CASQA	BASMAA, Countywide stormwater programs, Local governments, SFEP, STB, TPL, SPUR	<b>Support SB 231 Implementation.</b> Participate in strategic efforts to use SB 231 (which clarified that the Prop 218 “sewer” exemption includes storm sewers) to raise local stormwater fees in ways that do not engender unwanted lawsuits while establishing that the full scope of the exemption includes planning, constructing, and maintaining sustainable streets the establishment of reliable revenue sources may allow local stormwater programs to seek loans under SWRCB’s State Revolving Fund.
<b>Short-Term Actions</b>			
3-5	SFEP	BASMAA	<b>Convene the Roadmap Committee –</b> Monitor implementation of the Roadmap of Funding Solutions by convening the Roadmap Committee described in Section 3, Roles and Responsibilities. This will include at least two meetings per year. Potential agenda items include: <ul style="list-style-type: none"> <li>• Progress updates,</li> <li>• Reminders to partner agencies of action items,</li> <li>• Periodic reviews and adjustments of Specific Actions,</li> </ul> Updates regarding quantification of the need for GI, based on GI Plans prepared throughout the region.
3-6	MTC	BASMAA, SFEP, Countywide stormwater programs	<b>Coordinate with Local Agency Staff to Share Information -</b> Facilitate discussions among staff from public works, stormwater, active transportation, and transit to develop integrated approaches to Sustainable Streets – at MTC’s working groups and/or a set of outreach/coordination meetings led by BASMAA and/or other partners. This dialogue is anticipated to improve communication between funding agencies and local agencies regarding the funding process. Topics for sharing and dialogue may include how local agencies can build capacity to address long-term maintenance needs for GI, the types of tools that can help local agencies communicate internally and work together across departments and identifying types of information sharing that can reduce effort for both funding agencies and local agencies.
3-7	BASMAA	SFEP	<b>Prepare and Distribute a Fact Sheet of the Roadmap -</b> The fact sheet would help agencies communicate internally regarding actions to fund Sustainable Streets, and could potentially be used for other outreach, in coordination with Specific Action 3-9, Develop and Conduct Outreach Strategy.
3-8	Funding agencies <sup>5</sup>	--	<b>Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans and/or Other Documentation.</b> Funding agencies will each incorporate into its strategic plan the Specific Actions for which agency has been identified as Lead agency. Examples of policy documents include Green Building Policy, Sustainable Landscaping Guidelines, and BMPs.

<sup>5</sup> **Agencies implementing Action 3-8**  
ACTC, CCTA, SMCTA, VTA  
ACTC, C/CAG, CCTA, VTA  
BAAQMD  
Caltrans  
CNRA

**Applicable grant programs**  
Transportation half-cent sales tax measure programs  
Congestion Management Agency programs  
Transportation Fund for Clean Air  
Active Transportation Program, Cooperative Implementation Agreements  
Urban Greening grants

Table 3 Specific Actions for Additional Funding Options			
Specific Action No.	Entities Lead Support		Description of Action
<b>Actions to Achieve Long-Term Solutions</b>			
3-9	SFEP	BASMAA, BCDC, NRDC, Save the Bay, SPUR, TPL, Countywide stormwater programs	<b>Develop Outreach Strategy</b> - The strategy will identify the steps necessary to develop and implement an outreach program, seeking to build broader public engagement around Sustainable Streets. The strategy is anticipated to focus on the resiliency benefits of Sustainable and Streets and frame the issues as making streets better, laying the groundwork for a call to action around the Roadmap. The strategy will identify actions and assign roles for implementation. Depending on interests and capacities of support organizations, actions may encompass community outreach, elected official outreach, and business engagement. A Sustainable Streets fact sheet may be developed, focused on communicating to local elected officials the need for action to better fund Sustainable Streets. Part of the messaging is anticipated to present GI as an integral part of road projects. The Los Angeles River campaign is anticipated to serve as a model for the outreach strategy.

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DWR, SCC  
FEMA  
MTC  
SFBRA, SCC  
SGC  
SWRCB

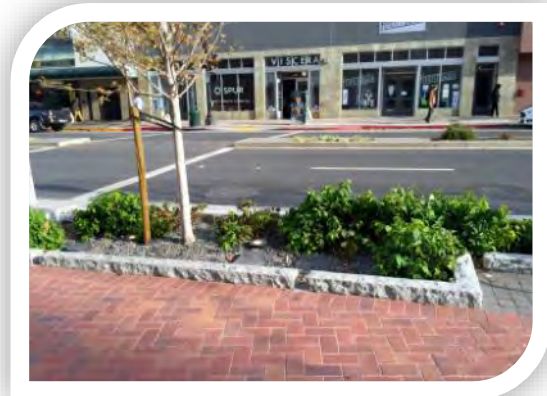
Proposition 1 grants  
Emergency Management Performance Grant  
One Bay Area Grants  
Measure AA Program  
Affordable Housing and Sustainable Communities Program  
Storm Water Grant Program

### 3. Roles and Responsibilities

The Roadmap will be implemented by Participating Agencies, Organizations, and Champions, with implementation monitored by a Roadmap Committee. These roles are described below, followed by a description of procedures to track and monitor implementation of the Roadmap.

#### Participating Agencies and Organizations

The Participating Agencies and Organizations are listed in Table 4, at the end of this section of the Roadmap. The agencies and organizations are categorized by type (federal agency, state agency, etc.) and listed alphabetically within these categories. Table 4 is cross-referenced to the lists of specific actions in Section 2, to identify the actions that each agency or organization is leading. Some actions are led by multiple parties, because individual agencies will conduct that action internally. For example, numerous funding agencies have committed to leading Action 1-4, Identify Opportunities to More Fully Fund Sustainable Streets, in which they will each review their own funding programs to identify opportunities to remove obstacles to the integrated funding of Sustainable Streets projects.



*This bioretention facility in Oakland receives stormwater runoff from both the roadway and an adjacent plaza (Source: Horizon)*

#### Champions

Champions are organizations that have the interest and capability to influence legislation and policy decisions, and generally advocate for the funding of Sustainable Streets. The current list of Champions is provided below.

- **Bay Area Stormwater Management Agencies Association (BASMAA)** – BASMAA is a consortium of nine San Francisco Bay Area municipal stormwater programs. BASMAA was started by local governments in response to municipal stormwater permits in an effort to promote regional consistency and facilitate efficient use of public resources. BASMAA is designed to encourage information sharing and cooperation, and to develop products and programs that are more cost-effective when done regionally than could be accomplished locally. In addition, BASMAA provides a forum for representing and advocating the common interests of member programs at the regional and state level.
- **San Francisco Bay Regional Water Quality Control Board (Regional Water Board)** – The Regional Water Board issued the current Municipal Regional Stormwater Permit on November 19, 2015, including in Provision C.3.j of the permit a requirement for the Permittees to prepare and implement Green Infrastructure Plans. Green Infrastructure Plans are required to include

targets for the amount of impervious surface to be retrofitted with green infrastructure by 2020, 2030, and 2040.

- **San Francisco Estuary Partnership (SFEP)** – SFEP is a collaboration of local, state, and federal agencies, NGOs, academia and business leaders working to protect and restore protect and restore the San Francisco Bay-Delta Estuary. SFEP builds partnerships and leverages federal funding with millions of dollars in state and local funds for regional-scale restoration, water quality improvement, and resilience-building projects (SFEP 2017).
- **Save The Bay** – Save The Bay is the largest regional organization working to protect, restore and celebrate San Francisco Bay since 1961. Save The Bay mobilizes thousands of Bay Area residents to protect and restore the Bay for future generations, both as advocates in their community and volunteers on the shoreline, working with scientists and policymakers to protect the Bay as the region's most important natural resource--essential to our environment, economy, and quality of life (Save The Bay 2017).

### Roadmap Committee

A Roadmap Committee will be formed to monitor and track progress of actions taken by agencies to make available funding for sustainable streets projects, to track the projects that succeed in obtaining funding, and periodically review and adjust Specific Actions as needed. This Committee may also identify needs for workgroups to implement various Specific Actions. The Roadmap Committee will consist of representatives of the Participating Agencies, potentially including local agency representatives, and is anticipated to elect officers for limited terms. The Committee is anticipated to meet at least twice a year, unless Committee members determine that more frequent meetings are needed. One annual meeting is anticipated to include progress reports and keynote speeches highlighting achievements by Participating Agencies and/or new advancements in Sustainable Streets.

### Tracking and Follow-up

The Roadmap Committee's primary tool for tracking and monitoring progress in implementing the actions listed in Section 2 is anticipated to be an online spreadsheet of specific actions, which would be editable by the representatives of Participating Agencies. Participating Agencies would periodically be reminded to populate the online spreadsheet with information on progress since the last update, which could be formatted as a progress report for annual meetings of the Roadmap Committee.

The Roadmap Committee will continue to follow up with partner agencies and organizations to identify additional Champions. For example, the Roadmap Committee is following up with the agencies listed below, as well as other agencies and organizations, regarding the potential to serve as Champions.

- **Department of Transportation (Caltrans)** – Through its Division of Local Assistance, Caltrans oversees more than one billion dollars annually available to over 600 cities, counties and regional agencies for the purpose of improving their transportation infrastructure or providing transportation services (Caltrans 2018). Some of the Division of Local Assistance grant programs, such as the Active Transportation Program, prioritize the funding of projects that include Sustainable Streets elements, such as bicycle and pedestrian improvements. Caltrans is subject to the California Department of Transportation Municipal Stormwater Permit, issued by the

State Water Board on September 19, 2012, as amended. As part of complying with this permit, the Caltrans Stormwater Program provides funding to local agencies for green infrastructure improvements through Cooperative Implementation Agreements.

- **Metropolitan Transportation Commission (MTC)** - MTC is the transportation planning, financing and coordinating agency for the nine-county San Francisco Bay Area. Congress distributes federal transportation dollars to MTC (and other metropolitan planning organizations) to invest in regional priority transportation projects and programs. MTC also helps local agencies in the Bay Area obtain state funding for transportation projects. In 2012, MTC established the One Bay Area Grant (OBAG) program, which taps federal funds to maintain MTC's commitments to regional transportation priorities while also advancing the Bay Area's land-use and housing goals. OBAG includes both a regional program administered by MTC and a county program that allows counties to use OBAG funds to invest in a range of street and road project types, including elements of Sustainable Streets projects.
- **State Water Resources Control Board (State Water Board)** – Through its Division of Financial Assistance, the State Water Board implements financial assistance programs, including the Storm Water Grant Program, loan and grant funding for construction of municipal sewage and water recycling facilities, remediation for underground storage tank releases, watershed protection projects, and nonpoint source pollution control projects (SWRCB 2018) . The State Water Board has experience collaborating with other funding agencies, including the Department of Water Resources.

### Sustainable Streets and Collaborative Action

This Roadmap sets forth a vision of collaborative action to implement specific actions to realize multi-benefit projects. This may challenge some existing organizational structures that were developed to support single-benefit projects. Agencies are making this commitment in order to realize a vision of multi-benefit projects that help make communities healthier and more vibrant than single-benefit projects of the past.



*Meeting of the Regional Roundtable on Sustainable Streets, March 2017*



Table 4 Agency or Organization Assignments			
Categories of Participants	Participating Agencies and Organizations	Specific Actions	
		Led by Agency or Organization	Supported by Agency or Organization
Federal Agencies	<ul style="list-style-type: none"> <li>Federal Emergency Management Agency</li> </ul>	1-4, Identify Opportunities to More Fully Fund Sustainable Streets 2-2, Inform Other Agencies of Solicitations 2-7, Consider Linkages to Other Programs 3-8, Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans, and/or Other Documentation	2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
	<ul style="list-style-type: none"> <li>Federal Highway Administration</li> <li>Federal Transit Administration</li> </ul>	--	1-1, Clarify GSI Eligibility in Federal Transportation Grants
State Agencies	<ul style="list-style-type: none"> <li>Caltrans Division of Local Assistance</li> </ul>	1-1, Clarify GSI Eligibility in Federal Transportation Grants	1-2, Update OBAG Guidance 1-3, Clarify GSI Eligibility in the Local Streets and Roads Program
	<ul style="list-style-type: none"> <li>Caltrans Stormwater Program</li> </ul>	1-4, Identify Opportunities to More Fully Fund Sustainable Streets 1-8, Address Caltrans Stormwater Treatment Credit 2-2, Inform Other Agencies of Solicitations 2-7, Consider Linkages to Other Programs	2-1, Coordinate to Publicize Solicitations 2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
	<ul style="list-style-type: none"> <li>Caltrans Active Transportation Program</li> <li>California Natural Resources Agency</li> <li>Department of Water Resources</li> <li>State Coastal Conservancy</li> <li>Strategic Growth Council</li> </ul>	1-4, Identify Opportunities to More Fully Fund Sustainable Streets 2-2, Inform Other Agencies of Solicitations 2-7, Consider Linkages to Other Programs 3-8, Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans, and/or Other Documentation	2-1, Coordinate to Publicize Solicitations 2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
	<ul style="list-style-type: none"> <li>State Water Resources Control Board</li> </ul>	2-1, Coordinate to Publicize Solicitations 2-2, Inform Other Agencies of Solicitations 2-7, Consider Linkages to Other Programs 3-8, Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans, and/or Other Documentation	1-7, Develop State Legislative Program 1-8, Address Caltrans Stormwater Treatment Credit 2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects



Table 4 Agency or Organization Assignments			
Categories of Participants	Participating Agencies and Organizations	Specific Actions	
		Led by Agency or Organization	Supported by Agency or Organization
State Agencies (cont.)			2-6, Identify Opportunities to Coordinate Reporting
Regional Agencies	<ul style="list-style-type: none"> <li>Bay Area Air Quality Management District</li> <li>San Francisco Bay Restoration Authority</li> </ul>	1-4, Identify Opportunities to More Fully Fund Sustainable Streets 2-2, Inform Other Agencies of Solicitations 2-7, Consider linkages to other programs 3-8, Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans, and/or Other Documentation	2-1, Coordinate to Publicize Solicitations 2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
	<ul style="list-style-type: none"> <li>Bay Conservation and Development Commission</li> </ul>	--	3-9, Develop Outreach Strategy
	<ul style="list-style-type: none"> <li>Metropolitan Transportation Commission</li> </ul>	1-2, Update OBAG Guidance 2-2, Inform Other Agencies of Solicitations 2-7, Consider Linkages to Other Programs 3-6, Coordinate with Local Agency Staff to Share Information 3-8, Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans, and/or Other Documentation	1-1, Clarify GSI Eligibility in Federal Transportation Grants 1-3, Clarify GSI Eligibility in the Local Streets and Roads Program 2-1, Coordinate to Publicize Solicitations 2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
	<ul style="list-style-type: none"> <li>San Francisco Bay Regional Water Quality Control Board</li> </ul>	1-5, Regional Water Board Staff to Review the Completed Checklists Prepared in Specific Action 1-4	1-6, Identify Opportunities to Influence Federal Policy 1-7, Develop State Legislative Program 1-8, Address Caltrans Stormwater Treatment Credit 2-3, Offer Training on Obtaining Grants
	<ul style="list-style-type: none"> <li>San Francisco Estuary Partnership</li> </ul>	1-7, Develop State Legislative Program 2-5, Track Upcoming Solicitations 2-6, Identify Opportunities to Coordinate Reporting 3-2, Improve the Existing Web Presence for the Roadmap	1-6, Identify Opportunities to Influence Federal Policy 3-4, Support SB 231 Implementation 3-6, Coordinate with Local Agency Staff to Share Information

Table 4 Agency or Organization Assignments			
Categories of Participants	Participating Agencies and Organizations	Specific Actions	
		Led by Agency or Organization	Supported by Agency or Organization
Regional Agencies (cont.)		3-3, Seek Funding for Roadmap Implementation 3-5, Convene the Roadmap Committee 3-7, Prepare and Distribute a Fact Sheet of the Roadmap 3-9, Develop Outreach Strategy	
County Transportation Agencies	<ul style="list-style-type: none"> <li>Alameda County Transportation Commission</li> <li>Contra Costa Transportation Authority</li> <li>San Mateo County/City Association of Governments</li> <li>San Mateo County Transportation Authority</li> <li>Santa Clara Valley Transportation Authority</li> </ul>	1-4, Identify Opportunities to More Fully Fund Sustainable Streets 2-2, Inform Other Agencies of Solicitations 2-7, Consider Linkages to Other Programs 3-8, Incorporate Applicable Specific Actions in Agency Policies, Procedures, Strategic Plans, and/or Other Documentation	2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
	<ul style="list-style-type: none"> <li>Napa County Transportation and Planning Agency</li> <li>San Francisco County Transportation Authority</li> <li>Solano Transportation Authority</li> <li>Sonoma County Transportation Authority</li> <li>Transportation Authority of Marin</li> </ul>	--	2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 2-6, Identify Opportunities to Coordinate Reporting
Local Storm-water Programs	<ul style="list-style-type: none"> <li>Alameda Countywide Clean Water Program</li> <li>Contra Costa Clean Water Program</li> <li>San Mateo Countywide Water Pollution Prevention Program</li> <li>Santa Clara Valley Urban Runoff Pollution Prevention Program</li> </ul>	3-1, Provide Guidance on a Range of Funding Options	3-4, Support SB 231 Implementation 3-6, Coordinate with Local Agency Staff to Share Information 3-9, Develop and Conduct Outreach Strategy

Table 4 Agency or Organization Assignments			
Categories of Participants	Participating Agencies and Organizations	Specific Actions	
		Led by Agency or Organization	Supported by Agency or Organization
Local Storm-water Programs (cont.)	<ul style="list-style-type: none"> <li>• Cities of American Canyon, Benicia, Calistoga, Napa, Petaluma, Sonoma, St. Helena, Yountville</li> <li>• Counties of Napa, Solano, Sonoma, and Vallejo</li> <li>• Fairfield-Suisun Urban Runoff Management Program</li> <li>• Marin County Stormwater Pollution Prevention Program</li> <li>• San Francisco Public Utilities Commission</li> <li>• Sonoma County Water Agency</li> <li>• Town of Ross</li> <li>• Vallejo Sanitation and Flood Control District</li> </ul>	--	3-6, Coordinate with local Agency Staff to Share Information 3-4, Support SB 231 Implementation
Non-Governmental Organizations	<ul style="list-style-type: none"> <li>• Bay Area Stormwater Management Agencies Association</li> </ul>	1-4, Identify Opportunities to More Fully Fund Sustainable Streets 2-3, Offer Training on Obtaining Grants 2-4, Prepare Guidance for Packaging Projects 3-9, Develop Outreach Strategy	1-7, Develop State Legislative Program 2-5, Track Upcoming Solicitations 2-6, Identify Opportunities to Coordinate Reporting 3-2, Improve the Existing Web Presence for the Roadmap 3-3, Seek Funding for Roadmap Implementation 3-4, Support SB 231 Implementation 3-5, Convene the Roadmap Committee 3-6, Coordinate with Local Agency Staff to share Information 3-7, Prepare and Distribute a Fact Sheet of the Roadmap 3-9, Develop Outreach Strategy
	<ul style="list-style-type: none"> <li>• Save The Bay</li> <li>• Trust for Public Land</li> </ul>	--	1-6, Identify Opportunities to Influence Federal Policy 1-7, Develop State Legislative Program

Table 4 Agency or Organization Assignments			
Categories of Participants	Participating Agencies and Organizations	Specific Actions	
		Led by Agency or Organization	Supported by Agency or Organization
Non-Governmental Organizations (cont.)			3-4, Support SB 231 Implementation 3-9, Develop Outreach Strategy
	• California Stormwater Quality Association	3-4, Support SB 231 Implementation	2-4, Prepare Guidance for Packaging Strategy
	• NRDC	--	3-9, Develop Outreach Strategy
	• SPUR	--	3-4, Support SB 231 Implementation 3-9, Develop Outreach Strategy



# Appendix A

## Acronyms and Definitions

This appendix provides a list of acronyms and glossary of technical terms used in the Roadmap.

### List of Acronyms

ACCWP	Alameda Countywide Clean Water Program
ACTC	Alameda County Transportation Commission
BAAQMD	Bay Area Air Quality Management District
BASMAA	Bay Area Stormwater Management Agencies Association
Caltrans	California Department of Transportation
CASQA	California Stormwater Quality Association
C/CAG	San Mateo County/City Association of Governments
CCCWP	Contra Costa Clean Water Program
CCTA	Contra Costa Transportation Authority
CMA	Congestion Management Agency
CNRA	California Natural Resources Agency
DWR	Department of Water Resources
FEMA	Federal Emergency Management Agency
GI	Green infrastructure
GSI	Green stormwater infrastructure
MRP	Municipal Regional Stormwater Permit
MTC	Metropolitan Transportation Commission
OBAG	One Bay Area Grant Program
RWQCB	Regional Water Quality Control Board
SCC	State Coastal Conservancy
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SFBRA	San Francisco Bay Restoration Authority
SFEP	San Francisco Estuary Partnership
SGC	Strategic Growth Council
SMCTA	San Mateo County Transportation Authority
SMCWPPP	San Mateo Countywide Water Pollution Prevention Program
STB	Save the Bay
VTA	Santa Clara Valley Transportation Authority
TMDL	Total Maximum Daily Load
TPL	Trust for Public Land
USEPA	United States Environmental Protection Agency

## Glossary of Terms

**Active Transportation:** Any self-propelled, human-powered mode of transportation, such as walking or bicycling (CDC 2011).

**Carbon sequestration:** Terrestrial, or biologic, carbon sequestration is the process by which trees and plants absorb carbon dioxide, release the oxygen, and store the carbon. Geologic sequestration is one step in the process of carbon capture and sequestration, and involves injecting carbon dioxide deep underground where it stays permanently (USEPA 2016).

**Complete Street:** A transportation facility that is planned, designed, operated, and maintained to provide safe mobility for all users, including bicyclists, pedestrians, transit vehicles, truckers, and motorists, appropriate to the function and context of the facility (Caltrans 2017a).

**Congestion Management Agency:** A congestion management agencies (CMA) is a countywide body funded by the state gas tax that works to keep traffic levels manageable. CMAs help coordinate land use, air quality and transportation planning among the local jurisdictions; prepare a congestion management program to spend gas tax funds; monitor levels of congestion on major roads; and analyze the impacts that a proposed development will have on future traffic congestion (Institute for Local Government 2015).

**Green infrastructure:** Green infrastructure is an approach to water management that protects, restores, or mimics the natural water cycle, providing habitat, flood protection, cleaner air, and cleaner water (American Rivers 2017).

**Green stormwater infrastructure:** Green stormwater infrastructure is type of green infrastructure that specifically addresses stormwater management. It includes a range of soil-water-plant systems that intercept stormwater, infiltrate a portion of it into the ground, evaporate a portion of it into the air, and in some cases release a portion of it slowly back into the storm drain system (Philadelphia Water Department 2017)

**Stormwater treatment system:** Any engineered system designed to remove pollutants from stormwater runoff by settling, filtration, biological degradation, plant uptake, media absorption/adsorption or other physical, biological, or chemical process (San Francisco Bay Regional Water Quality Control Board 2015)

**Sustainable Street:** Roadway segment that includes both complete streets features and green stormwater infrastructure, and that is maintained in a state of good or fair condition.

**Total Maximum Daily Load:** After the identification of a water quality-limited waterbody is completed, a Total Maximum Daily Load is established at a level necessary to achieve the applicable state water quality standards (USEPA 2017c). A TMDL establishes the maximum amount of a pollutant allowed in a waterbody and serves as the starting point or planning tool for restoring water quality (USEPA 2017d).

**Urban greening:** An integrated, citywide approach to the planting, care and management of all vegetation in a city to secure multiple environmental and social benefits for urban dwellers; projects may involve planting of trees, shrubs, grass, or agricultural plots (Sorensen et al. 1997).





## Appendix B

### Potential Sources of Funding for Sustainable Streets

This appendix provides two tables that, taken together, identify a range of funding sources that may potentially be used to fund Sustainable Streets projects. Table B-1 includes transportation funding sources and presents available information regarding the eligibility of green stormwater infrastructure. Table B-2 includes resource-related funding sources and presents available information regarding the eligibility of transportation features.

Table B-1 Transportation Funding Sources that May Potentially Fund Sustainable Streets					
Row No.	Name of Funding Source	Administering Agency	Funded by	Conditions under which Green Stormwater Infrastructure is Eligible	Link to information
1	One Bay Area Grant Program	Metropolitan Transportation Commission (MTC)	<ul style="list-style-type: none"> <li>Surface Transportation Block Grant Program (STP – federal funding)</li> <li>Congestion Mitigation and Air Quality Improvement (CMAQ – federal funding)</li> <li>(Source: MTC 2017)</li> </ul>	<ul style="list-style-type: none"> <li>Permeable pavement is eligible.</li> <li>Landscaping as part of streetscape improvement or safety improvement is eligible.</li> <li>GSI is eligible if required for mitigation.</li> <li>Dependent on various goals and guidelines of OBAG sub-programs</li> <li>Must comply with all Federal &amp; State &amp; Regional &amp; County level (for county programs) regulations.</li> <li>Follows Caltrans Federal Aid Delivery process.</li> <li>(Sources: MTC 2015a, Atkinson 2017)</li> </ul>	<a href="http://mtc.ca.gov/our-work/invest-protect/focused-growth/one-bay-area-grants">http://mtc.ca.gov/our-work/invest-protect/focused-growth/one-bay-area-grants</a> (Source: MTC 2017a)
2	Active Transportation Program	California Transportation Commission (CTC)	Myriad of fund sources that will have to be obtained from CTC	<ul style="list-style-type: none"> <li>Scoring criteria is a balance dictated by the various fund sources.</li> <li>Landscaping as part of the ATP project that meets the program goals are eligible expenses.</li> <li>Projects must comply with all Federal and State regulations and must follow the Caltrans Federal Aid and CTC delivery process.</li> </ul>	<a href="http://www.dot.ca.gov/hq/LocalPrograms/atp/">www.dot.ca.gov/hq/LocalPrograms/atp/</a> (Source: Caltrans 2017b)
3	TDA Article 3	MTC establishes guidelines; counties administer funding per MTC guidelines (Source: MTC 2017b)	State funded through Transportation Development Act (TDA), Public Utilities Code (PUC) Section 99200	<ul style="list-style-type: none"> <li>Intersection safety improvements including bulbouts/curb extensions (Source: MTC 2016).</li> <li>Curb and gutter improvements were not specifically mentioned in the guidelines, but would be integral to curb extension construction.</li> </ul>	<a href="http://mtc.ca.gov/our-work/fund-invest/investment-strategies-commitments/transit-21st-century/funding-sales-tax-and-0">http://mtc.ca.gov/our-work/fund-invest/investment-strategies-commitments/transit-21st-century/funding-sales-tax-and-0</a> (Source: MTC 2017b)
4	Transportation for Livable Communities	Counties administer Transportation for Livable Communities funding (Sources: ACTC 2012, CCTA 2017, C/CAG 2016, VTA 2017)	Funding sources may vary by county. (Sources: ACTC 2012, CCTA 2017, C/CAG 2016, VTA 2017)	<ul style="list-style-type: none"> <li>Eligibility may vary by county.</li> </ul>	Alameda: <a href="http://www.alamedactc.org/app_pages/view/8057">www.alamedactc.org/app_pages/view/8057</a> (ACTC 2012a) Contra Costa: <a href="http://www.ccta.net/resources/detail/18/1">www.ccta.net/resources/detail/18/1</a> (CCTA 2017a) San Mateo: <a href="http://ccag.ca.gov/wp-content/uploads/2016/06/OBAG-TLC-Scoring-Criteria.pdf">http://ccag.ca.gov/wp-content/uploads/2016/06/OBAG-TLC-Scoring-Criteria.pdf</a> (C/CAG 2016) Santa Clara: <a href="http://www.vta.org/projects-and-programs/call-for-projects">www.vta.org/projects-and-programs/call-for-projects</a> (VTA 2017a)
5	Safe Routes to School	MTC establishes guidelines; counties administer funding per MTC guidelines.	CMAQ funding (Source: MTC 2015b)	<ul style="list-style-type: none"> <li>MTC guidelines identify new curbs and gutters as eligible improvements for pedestrian improvement projects (Source: MTC 2012).</li> </ul>	<a href="http://mtc.ca.gov/tags-public/safe-routes-school">http://mtc.ca.gov/tags-public/safe-routes-school</a> (MTC 2017c)
6	TIGER grants	FHWA	FHWA	<ul style="list-style-type: none"> <li>National competition aimed at highway/ Bridge bike/ped/passenger and freight rail/port / intermodal projects.</li> <li>Very intensive benefit-cost analysis required.</li> <li>Infrastructure as required mitigation is probably eligible.</li> </ul>	<a href="https://www.transportation.gov/tiger">https://www.transportation.gov/tiger</a> (USDOT 2017)

Table B-1 Transportation Funding Sources that May Potentially Fund Sustainable Streets					
Row No.	Name of Funding Source	Administering Agency	Funded by	Conditions under which Green Stormwater Infrastructure is Eligible	Link to information
7	Transportation Fund for Clean Air	BAAQMD	State Funding	<ul style="list-style-type: none"> <li>The Application Guidance for the Bicycle Facilities Grant Program does not specifically mention storm drainage, landscaping, or other project activities directly related to green stormwater infrastructure (BAAQMD 2017b); however, an informational interview with BAAQMD staff (BASMAA 2016) indicated that green stormwater infrastructure improvements, or other landscaping improvements, may be eligible due to carbon sequestration benefits.</li> </ul>	<a href="http://www.baaqmd.gov/grant-funding/public-agencies">http://www.baaqmd.gov/grant-funding/public-agencies</a> (BAAQMD 2017a)
8	Affordable Housing and Sustainable Communities	Strategic Growth Council guidelines.	State Cap and Trade Funding	<ul style="list-style-type: none"> <li>Urban greening costs are eligible, and projects must include at least one urban greening element. The definition of urban greening includes natural infrastructure and stormwater features. Natural infrastructure is defined as the preservation and/or restoration of ecological systems, or utilization of engineered systems that use ecological processes, to increase resiliency to climate change and/or manage other environmental problems.</li> <li>Projects may receive up to 3 points for incorporating natural infrastructure, if the surrounding community is experiencing any specific climate vulnerabilities and the project aims to address specific concerns. (Source SGC 2017)</li> </ul>	<a href="http://www.sgc.ca.gov/Grant-Programs/AHSC-Program.html">http://www.sgc.ca.gov/Grant-Programs/AHSC-Program.html</a> (SGC 2015)
9	Half-cent sales tax measure funding (different measures for different counties)	ACTC – Alameda County CCTA – Contra Costa County VTA – Santa Clara County SMCTA – San Mateo County	Countywide sales taxes	Eligibility policies vary by county.	<p>Alameda County: Measure B: <a href="http://www.alamedactc.org/app_pages/view/4617">www.alamedactc.org/app_pages/view/4617</a> (ACTC 2012b) Measure BB: <a href="http://www.alamedactc.org/news_items/view/14837">www.alamedactc.org/news_items/view/14837</a> (ACTC 2015)</p> <p>Contra Costa County Measure J: <a href="http://www.ccta.net/sources/detail/2/1">www.ccta.net/sources/detail/2/1</a> (CCTA 2017b)</p> <p>San Mateo County Measure A: <a href="http://www.smcta.com/about/About_Measure_A.html">www.smcta.com/about/About_Measure_A.html</a> (SMCTA 2012)</p> <p>Santa Clara County: Measure A Transit Improvements: <a href="http://www.vta.org/projects-and-programs/programs/2000-measure-a-transit-improvement-program">www.vta.org/projects-and-programs/programs/2000-measure-a-transit-improvement-program</a> (VTA 2015) Measure B: <a href="http://www.vta.org/measure-b-2016">www.vta.org/measure-b-2016</a> (VTA 2017b)</p>

Table B-2 Resource-Based Grant and Loan Programs that May Potentially Fund Sustainable Streets					
Row No.	Name of Funding Source	Administering Agency	Funded by	Conditions under which Transportation is Eligible	Link to information
1	Prop 1 Stormwater Grant Program	State Water Resources Control Board	State Proposition 1	<ul style="list-style-type: none"> <li>Costs for permeable pavement are eligible</li> <li>Costs for bike lanes/pedestrian pathways/alternate transit lane could be eligible if GHG reduction is shown as a quantifiable benefit (Source: BASMAA 2017b)</li> </ul>	<a href="http://www.waterboards.ca.gov/water_issues/programs/grants_loans/swgp/prop1/">www.waterboards.ca.gov/water_issues/programs/grants_loans/swgp/prop1/</a> (Source: SWRCB 2017)
2	Prop 1 Integrated Regional Water Management Grants	Department of Water Resources	State Proposition 1	<ul style="list-style-type: none"> <li>The guidelines for the 2016 round of funding do not specifically address the eligibility of the transportation features of Sustainable Streets projects; however, projects receive points for demonstrating a reduction of GHG (DWR 2016)</li> </ul>	<a href="http://www.water.ca.gov/irwm/grants/prop1index.cfm">http://www.water.ca.gov/irwm/grants/prop1index.cfm</a> (DWR 2017)
3	State Coastal Conservancy	Prop 1 Grants	State Proposition 1	<ul style="list-style-type: none"> <li>The program funds multi-benefit projects in four focus areas: Fisheries, Wetlands restoration, Agricultural water use/ ecosystem, and Urban Greening. Urban greening looks as multi-benefits, including public access to ecological resources, carbon sequestration, enhancement of urban park, with a focus on ecological function (BASMAA 2017a).</li> <li>The grant guidelines do not specifically address the eligibility of the transportation features of Sustainable Streets projects; however, one of the project selection criteria is for project design and construction methods to include measures to avoid or minimize GHG emissions to the extent feasible and consistent with the project objectives (SCC 2016).</li> </ul>	<a href="http://scc.ca.gov/grants/proposition-1-grants/">http://scc.ca.gov/grants/proposition-1-grants/</a> (SCC 2017)
4	Measure AA	San Francisco Bay Restoration Authority	Regional Measure AA	<ul style="list-style-type: none"> <li>The program generally looks at larger scale GSI, but could fund water quality treatment systems along urbanized shorelines of the Bay. Projects in association with restoration and/or along shore or Bay edge may be eligible (BASMAA 2017a).</li> <li>The Measure AA grant guidelines do not mention roads or streets. Eligible project types include trails and levees (SFBRA 2017b).</li> </ul>	<a href="http://sfbayrestore.org/sf-bay-restoration-authority-grants.php">http://sfbayrestore.org/sf-bay-restoration-authority-grants.php</a> (SFBRA 2017a)
5	Urban Greening Grants	California Natural Resources Agency	State Cap and Trade funding	<ul style="list-style-type: none"> <li>Eligible activities include green street and alleyway projects that integrate green stormwater infrastructure elements into the street or alley design, including permeable surfaces, bioswales, and trees (CNRA 2017b).</li> </ul>	<a href="http://resources.ca.gov/grants/urban-greening/">http://resources.ca.gov/grants/urban-greening/</a> (CNRA 2017a)
6	Emergency Management Performance Grant	Federal Emergency Management Agency	Appropriation Authority for Program: Department of Homeland Security Appropriations Act, 2017 (Pub. L. No. 115-31)	<ul style="list-style-type: none"> <li>This is a planning grant that provides Federal funds to states to assist state, local, territorial, and tribal governments in preparing for all</li> </ul>	<a href="https://www.fema.gov/preparedness-non-disaster-grants">https://www.fema.gov/preparedness-non-disaster-grants</a> (FEMA 2017)

Table B-2 Resource-Based Grant and Loan Programs that May Potentially Fund Sustainable Streets					
Row No.	Name of Funding Source	Administering Agency	Funded by	Conditions under which Transportation is Eligible	Link to information
				hazards. Examples of funded activities include conducting risk assessments and updating emergency plans (USDHS and FEMA 2017).	
7	Cooperative Implementation Agreements for Total Maximum Daily Load (TMDL) Compliance	Caltrans Stormwater Program	Caltrans Stormwater Program funding	<ul style="list-style-type: none"> <li>As of March 2018, the program had funded three local agency projects through cooperative implementation agreements in the San Francisco Bay Area; none were Sustainable Street projects. Sustainable Streets projects in the SF Bay Area could potentially be eligible; however, this program can only fund water quality improvements. Key criteria include: the number of TMDL pollutants that will be addressed (including trash) and the amount of Caltrans right of way that is treated. Projects that infiltrate or capture and use stormwater are preferred.</li> </ul>	For information, contact Tom Rutsch, <a href="mailto:tom.rutsch@dot.ca.gov">tom.rutsch@dot.ca.gov</a>
8	San Francisco Bay Water Quality Improvement Grants	USEPA	The funds for the awards under the 2017 RFP were appropriated to USEPA under the "Further Continuing and Security Assistance Appropriations Act, 2017" (Public Law 114-254) and will be issued under Section 320 of the Clean Water Act (National Estuary Program), 33 U.S.C. §1330 (USEPA 2017b).	<ul style="list-style-type: none"> <li>Eligible projects include projects that manage stormwater with low impact development and green stormwater infrastructure; projects should be based on a restoration plan, TMDL, stormwater/green stormwater infrastructure plan, or watershed plan (USEPA 2017b).</li> </ul>	<a href="http://www.epa.gov/sfbay-delta/sf-bay-water-quality-improvement-fund">www.epa.gov/sfbay-delta/sf-bay-water-quality-improvement-fund</a> (USEPA 2017)
9	Clean Water State Revolving Fund (CWSRF)	SWCRB	The CWSRF provides below-market rate financing, funded by the California Infrastructure and Economic Development Bank State Revolving Funds revenue bonds (Fitch Ratings 2014).	<ul style="list-style-type: none"> <li>Eligible projects include planning, design, and/or construction of publicly-owned storm water treatment and control facilities.</li> </ul>	<a href="http://www.waterboards.ca.gov/water_issues/programs/grants_loans/">www.waterboards.ca.gov/water_issues/programs/grants_loans/</a> (SWCRB 2018)

# Appendix C

## Solutions Considered and Withdrawn

A number of potential solutions were developed as part of the Regional Roundtable of Funding Solutions for Sustainable Streets but were withdrawn from further consideration based on input provided by agencies participating in the roundtable process. These potential solutions are listed in Table C-1, together with an explanation of the basis for withdrawing the solutions from further consideration.

Table C-1 Potential Solutions Considered and Withdrawn from Further Consideration	
Potential Solution	Basis for Withdrawing the Potential Solution
<p><b>Single Distribution</b> – Create a single distribution of funding for projects that include both green stormwater infrastructure and transportation improvements that reduce greenhouse gases.</p>	<p>This potential solution would have introduced difficulties inherent in mixing funds from different sources, since each funding source has been developed to address layers of objectives, as well as the agency mission and the funding source needs. Funding agencies participating in the Regional Roundtable for Funding Sustainable Streets did not support this potential solution.</p>
<p><b>Coordinate the Timing of Funding Cycles</b> – Coordinate the timing of funding cycles among agencies, in order to publish solicitations for different grants that fund Sustainable Streets within a given timeframe. This would make it more possible for one project to receive funding from multiple grants.</p>	<p>The timing of the funding cycle for each funding source is subject to many diverse factors, such as funding appropriations, which are unlikely to be changed in order to accommodate a subset of eligible types of projects.</p>



## Appendix D

### Checklist for Identifying Opportunities to Improve Funding of Sustainable Streets

This checklist is provided for use by individual funding agencies to review policy documents regarding their programs. For questions that receive a “YES” answer, enter in the “Potential Revisions for Consideration” columns potential changes to policies and procedures that would improve the funding of Sustainable Street projects. Potential revisions that could be done the program level go in the “Program Revisions” column, and potential revisions that require legislation go in the “Legislative Revisions” column. If you cannot currently determine whether legislation would be required, please indicate in the “Legislative Revisions” column that legislation may be required, pending more information.

YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
<b>Questions Regarding Pathway 1: Prioritize Sustainable Streets in Funding Sources</b>					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. If the funding source is a transportation grant, does it restrict the use of funds for green stormwater infrastructure? If yes, please describe the restrictions in the “Items to Consider Revising” columns. If applicable, include a discussion of how Transportation Asset Management (TAM) is used at the funding program level, and how TAM addresses or does not address green stormwater infrastructure.		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. If the funding source is a resource grant, does it restrict the use of funds for transportation improvements that reduce greenhouse gases? If yes, please describe the restrictions in the “Items to Consider Revising” columns.		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	3. Is the maximum grant amount too low to fully fund the construction of both the transportation and green stormwater infrastructure features of a Sustainable Streets project? If yes, please indicate in the “Items to Consider Revising” columns whether an increase in the maximum grant amount could be considered.		
<b>Questions Regarding Pathway 2: Improve Conditions for Using Multiple Grants</b>					
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	4. To simplify the application process for projects that must obtain multiple grants,		



YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
			would the agency consider coordinating with other funding agencies to develop a basic application form, which each agency could modify as needed for each funding program?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Would the agency consider incorporating into the guidelines for its funding program(s) statewide guidance on how to “package” Sustainable Streets projects for specific grants?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	6. Would the agency consider jointly establishing a match with other agencies – for example, would resource agencies consider establishing a standard local match similar to transportation grants?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	7. If grant recipients may combine this grant with other grants, is your agency willing to coordinate with the other funding agencies to allow joint reporting?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	8. If the funding source does not fund all aspects of Sustainable Streets, does the scoring system put projects at a disadvantage if they include ineligible costs?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	9. If grant recipients may combine this grant with other grants, is your agency willing to coordinate among agencies to time solicitations?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10. If your agency does not currently include in solicitations the extensions that may be available, would you be willing to include this information in order to assist applicants in evaluating the potential alignment of grant periods of different grants that may be combined for a project?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	11. Are any of the following activities ineligible under the grant program: planning, design, construction, and/or short-term maintenance, and monitoring?		

YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	12. How does the funding program ensure that the various regions of the state get their fair share of funding?		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	13. How does the funding program address the need for green stormwater infrastructure to be provided in old industrial areas, which will help meet load reduction targets for PCBs? Please describe any ways in which locating Sustainable Streets in the old industrial areas are encouraged or discouraged.		
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	14. For urban greening grant programs, would the agency be willing to coordinate with other urban greening programs in order to standardize urban greening solicitations to the extent possible?		



# Appendix E

## Case Studies

Two case studies were conducted to identify opportunities to improve funding of Sustainable Streets. The case studies are intended to serve as examples for how funding agencies may use the checklist provided in Appendix D to review their funding programs and develop specific actions to improve funding of Sustainable Streets projects. The two case studies focused, respectively on the One Bay Area Grant (OBAG) county program managed by the Metropolitan Transportation Commission (MTC) and the Storm Water Grant Program (SWGP) managed by the State Water Resources Control Board (SWRCB). The results of each case study is presented in the format of the checklist provided in Appendix D, followed by an explanation of how specific actions were identified based on the results.

### One Bay Area Grant (OBAG) Case Study

The following checklist presents the results of a review of MTC Resolution 4202, Adoption of the project selection policies and project programming for the second round of the One Bay Area Grant program (OBAG 2), using the checklist in Appendix D. This review focused on the OBAG County Program, which provides funding for grants administered by the nine Bay Area counties. Resolution 4202 establishes regional policies that must be followed by each county’s OBAG program. Following the checklist is a discussion of how the results were used to develop specific actions included in the Roadmap.

<b>OBAG County Program Case Study</b>						
<b>Identifying Opportunities to Improve Funding of Sustainable Streets</b>						
			<b>Potential Revisions for Consideration</b>			
YES	NO	N/A	Question	Program Revisions	Legislative Revisions	
<b>Questions Regarding Pathway 1: Prioritize Sustainable Streets in Funding Sources</b>						
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	1. If the funding source is a transportation grant, does it restrict the use of funds for green stormwater infrastructure? If yes, please describe the restrictions in the “Potential Revisions for Consideration” columns.	<ul style="list-style-type: none"> <li>Eligibility is governed by federal law. Some GSI components of Sustainable Streets projects, such as pervious paving, are clearly eligible. It would be helpful to have guidance to assist grant applicants in demonstrating the benefits of GSI in transportation projects.</li> </ul>	<ul style="list-style-type: none"> <li>The Water Environment Foundation has been involved in the public review of federal surface transportation legislation and may seek to influence eligibility of GSI in future federal surface transportation acts. If other regional partners seek to influence GSI eligibility in federal legislation,</li> </ul>	

OBAG County Program Case Study Identifying Opportunities to Improve Funding of Sustainable Streets					
YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
				<ul style="list-style-type: none"> <li>Coordination with Caltrans is recommended to clarify eligibility of GSI components in federally funded transportation projects.</li> </ul>	they should inform MTC. MTC conducts legislative advocacy on the federal level.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	2. If the funding source is a resource grant, does it restrict the use of funds for transportation improvements that reduce greenhouse gases? If yes, please describe the restrictions in the “Potential Revisions for Consideration” columns.	<ul style="list-style-type: none"> <li>The funding source is not a resource grant.</li> </ul>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Is the maximum grant amount too low to fully fund the construction of both the transportation and green stormwater infrastructure features of a Sustainable Streets project? If yes, please indicate in the “Potential Revisions for Consideration” columns whether an increase in the maximum grant amount could be considered.	<ul style="list-style-type: none"> <li>MTC does not specify a maximum amount for OBAG County Program grants.</li> </ul>	
Questions Regarding Pathway 2: Improve Conditions for Using Multiple Grants					
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. To simplify the application process for projects that must obtain multiple grants, would the agency consider coordinating with other funding agencies to develop a basic application form, which each agency could modify as needed for each funding program?	<ul style="list-style-type: none"> <li>OBAG2, proposition, and other funding program requirements are too unique to fit into a “single application” solution. However, MTC is looking at ways to coordinate regional programs to develop an MTC application that may be used for multiple programs.</li> </ul>	N/A

OBAG County Program Case Study					
Identifying Opportunities to Improve Funding of Sustainable Streets					
YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Would the agency consider incorporating into the guidelines for its funding program(s) statewide guidance on how to “package” Sustainable Streets projects for specific grants?	<ul style="list-style-type: none"> <li>This type of guidance could be helpful for grant applicants to demonstrate multiple benefits of GSI in transportation projects.</li> </ul>	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Would the agency consider jointly establishing a match with other agencies – for example, would resource agencies consider establishing a standard local match similar to transportation grants?	<ul style="list-style-type: none"> <li>The OBAG match requirement is determined by federal law.</li> </ul>	<ul style="list-style-type: none"> <li>No changes to the federally-legislated 11.47% non-federal local match requirement are anticipated.</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. If grant recipients may combine this grant with other grants, is your agency willing to coordinate with the other funding agencies to allow joint reporting?	<ul style="list-style-type: none"> <li>MTC does not have reporting requirements for OBAG.</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. If the funding source does not fund all aspects of Sustainable Streets, does the scoring system put projects at a disadvantage if they include ineligible costs?	<ul style="list-style-type: none"> <li>The OBAG program already includes an emphasis on multi-modal, multi-benefit projects. Additionally, OBAG criteria do not include a requirement to look at cost/benefit.</li> </ul>	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	9. If grant recipients may combine this grant with other grants, is your agency willing to coordinate among agencies to time solicitations?	<ul style="list-style-type: none"> <li>MTC is looking at ways to coordinate regional programs, and could inform other funding agencies of its RFPs.</li> </ul>	<ul style="list-style-type: none"> <li>Federal legislation dictates when funds are spent; there are no opportunities to time the requirements with other programs.</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10. If your agency does not currently include in solicitations the extensions that may be available, would you be willing to include this information in order to assist applicants in evaluating the potential alignment of grant periods of different grants that may be combined for a project?	<ul style="list-style-type: none"> <li>The obligation and delivery deadlines are already described in the OBAG policy resolution; extensions are not available.</li> </ul>	

OBAG County Program Case Study Identifying Opportunities to Improve Funding of Sustainable Streets					
YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11. Are any of the following activities ineligible under the grant program: planning, design, construction, and/or short-term maintenance, and monitoring?	<ul style="list-style-type: none"> <li>OBAG grants can be used for planning, design, construction, and short-term establishment. Eligibility for maintenance is determined by federal law.</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. For urban greening grant programs, would the agency be willing to coordinate with other urban greening programs in order to standardize urban greening solicitations to the extent possible?	<ul style="list-style-type: none"> <li>The funding source is not an urban greening grant program.</li> </ul>	

As a result of completing the above checklist for the OBAG program, four Specific Actions were identified. The relationship between these specific actions and the information in the checklist is shown in Table E-1.

Table E-1 Relationship between Specific Actions and the OBAG Program Review			
Specific Action	Agencies/Organizations		Applicable Items from the OBAG Review Checklist
	Lead	Support	
<b>1-1, Clarify GSI Eligibility in Federal Transportation Grants</b> - Provide clarification of the eligibility of GSI elements in federally-funded transportation projects	Caltrans	FHWA, MTC	The clarification of eligibility proposed in Specific Action 1-1 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 1 (Eligibility of GSI components of Sustainable Streets)</li> </ul>
<b>1-2, Update OBAG Guidance</b> - Develop guidance clarifying eligibility of GSI elements in federally funded (One Bay Area Grant - OBAG) transportation projects, for inclusion in guidance materials that MTC will provide to counties for OBAG's third round of funding (OBAG 3)	MTC	Caltrans	Guidance proposed in Specific Action 1-2 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 1 (Eligibility of GSI components of Sustainable Streets)</li> </ul>
<b>1-6, Identify Opportunities to Influence Federal Policy</b> - Identify opportunities to support efforts by Champions to influence eligibility of GSI in federal surface transportation programs, maintaining communication with MTC on legislative engagement and/or advocacy	BASMAA	SFEP, Trust for Public Land, Save the Bay	The federal legislative engagement and/or advocacy proposed in Specific Action 1-6 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 1 (Eligibility of GSI components of Sustainable Streets)</li> </ul>
<b>2-2, Inform other agencies of solicitations</b> - Identify and add staff from applicable agencies to the list of parties to notify regarding schedules of future solicitations for applicable grant programs	Funding agencies, including MTC	None	The coordination proposed in Specific Action 2-2 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 9 (Coordinate timing of solicitations)</li> </ul>



## Storm Water Grant Program (SWGP) Case Study

The following checklist presents the results of a review of the State Water Resources Control Board’s (SWRCB) Proposition 1 Storm Water Grant Program Guidelines (SWRCB 2015), which was conducted using the checklist in Appendix D. Following the checklist is a discussion of how the results were used to develop specific actions included in the Roadmap.

SWGP Case Study					
Identifying Opportunities to Improve Funding of Sustainable Streets					
YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
<b>Questions Regarding Pathway 1: Prioritize Sustainable Streets in Funding Sources</b>					
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	1. If the funding source is a transportation grant, does it restrict the use of funds for green stormwater infrastructure? If yes, please describe the restrictions in the “Potential Revisions for Consideration” columns.	<ul style="list-style-type: none"> <li>The funding source is not a transportation grant.</li> </ul>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	2. If the funding source is a resource grant, does it restrict the use of funds for transportation improvements that reduce greenhouse gases? If yes, please describe the restrictions in the “Potential Revisions for Consideration” columns.	<ul style="list-style-type: none"> <li>Costs for impervious surfaces are generally ineligible; however, costs for bike lanes, pedestrian pathways, and/or alternate transit lanes could be eligible if greenhouse gas (GHG) reduction is shown as a quantifiable benefit. Guidance may be provided to assist applicants in documenting multiple benefits of GSI.</li> </ul>	<ul style="list-style-type: none"> <li>Fure grant programs could consider how the program may support the funding of Sustainable Streets as eligibility criteria are developed.</li> </ul>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Is the maximum grant amount too low to fully fund the construction of both the transportation and green stormwater infrastructure features of a Sustainable Streets project? If yes, please indicate in the “Potential Revisions for Consideration” columns whether an increase in the maximum grant amount could be considered.	<ul style="list-style-type: none"> <li>Although the maximum implementation grant amount is \$10 million, projects that seek funding under the Storm Water Grant Program often combine funding from multiple sources.</li> </ul>	N/A

SWGP Case Study					
Identifying Opportunities to Improve Funding of Sustainable Streets					
YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	
				Legislative Revisions	
Questions Regarding Pathway 2: Improve Conditions for Using Multiple Grants					
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	4. To simplify the application process for projects that must obtain multiple grants, would the agency consider coordinating with other funding agencies to develop a basic application form, which each agency could modify as needed for each funding program?	<ul style="list-style-type: none"> <li>The SWGP and other funding program requirements are too unique to fit into a “single application” solution.</li> </ul>	<ul style="list-style-type: none"> <li>It may be possible to influence the development of future propositions/enacting legislation to coordinate some elements of application requirements with other grant programs that fund Sustainable Streets</li> </ul>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5. Would the agency consider incorporating into the guidelines for its funding program(s) statewide guidance on how to “package” Sustainable Streets projects for specific grants?	<ul style="list-style-type: none"> <li>This type of guidance could be helpful for grant applicants to demonstrate multiple benefits of Sustainable Streets projects, including GHG reduction.</li> </ul>	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	6. Would the agency consider jointly establishing a match with other agencies – for example, would resource agencies consider establishing a standard local match similar to transportation grants?	<ul style="list-style-type: none"> <li>The SWGP match requirement was dictated by the chapter of State law into which the program was incorporated.</li> <li>Guidance could be developed to help applicants demonstrate the eligibility of transportation elements, such as the use of permeable paving, so that funding of those elements could be</li> </ul>	<ul style="list-style-type: none"> <li>As future funding programs based on future propositions are developed, there may be opportunities to influence related legislation and the incorporation into a chapter of state law.</li> </ul>

SWGP Case Study					
Identifying Opportunities to Improve Funding of Sustainable Streets					
YES	NO	N/A	Question	Potential Revisions for Consideration	
				Program Revisions	Legislative Revisions
				identified as matching funds.	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	7. If grant recipients may combine this grant with other grants, is your agency willing to coordinate with the other funding agencies to allow joint reporting?	<ul style="list-style-type: none"> <li>SWRCB currently allows grant recipients to establish some milestone dates. If reporting requirements of applicable funding programs are compared, there may be opportunities to coordinate the reporting schedule, format, etc.</li> </ul>	N/A
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	8. If the funding source does not fund all aspects of Sustainable Streets, does the scoring system put projects at a disadvantage if they include ineligible costs?	<ul style="list-style-type: none"> <li>The SWGP's scoring criteria do not penalize projects that include ineligible costs.</li> </ul>	
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	9. If grant recipients may combine this grant with other grants, is your agency willing to coordinate among agencies to time solicitations?	<ul style="list-style-type: none"> <li>Timing of solicitations is subject to state budget allocation. Bond law dictates when funds must be spent.</li> <li>While the SWGP has no flexibility in the timing of solicitations, there are opportunities to coordinate information. SWRCB participates in funding fairs and the California Financing Coordinating Committee website. A database of grants/upcoming solicitations could be</li> </ul>	N/A

SWGP Case Study Identifying Opportunities to Improve Funding of Sustainable Streets				
YES	NO	N/A	Question	Potential Revisions for Consideration Program Revisions      Legislative Revisions
				developed. Funding agencies could inform one another on RFP timing.
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	10. If your agency does not currently include in solicitations the extensions that may be available, would you be willing to include this information in order to assist applicants in evaluating the potential alignment of grant periods of different grants that may be combined for a project?	<ul style="list-style-type: none"> <li>Time extension requests are never guaranteed and may be denied by the Governor.</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	11. Are any of the following activities ineligible under the grant program: planning, design, construction, and/or short-term maintenance, and monitoring?	<ul style="list-style-type: none"> <li>Grants can only cover costs incurred within the grant period.</li> </ul>
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	12. For urban greening grant programs, would the agency be willing to coordinate with other urban greening programs in order to standardize urban greening solicitations to the extent possible?	<ul style="list-style-type: none"> <li>The funding source is not an urban greening grant program.</li> </ul>

As a result of completing the above checklist for the SWGP, four Specific Actions were identified. The relationship between these specific actions and the information in the checklist is explained in Table E-2.

Table E-2 Relationship between Specific Actions and the SWGP Review			
Specific Action	Agencies/Organizations		Applicable Items from the SWGP Review Checklist
	Lead	Support	
<b>1-7, Develop State Legislative Program</b> - Develop and implement an initiative to influence future state propositions, related legislation, and incorporation into a chapter of state law – to provide a clear path for full eligibility of Sustainable Streets, and coordinate application requirements among grant programs that fund Sustainable Streets	SFEP	SWRCB, RWQCB, BASMAA, Champions	The State Legislative Program proposed in Specific Action 1-7 would address issues discussed in the following checklist items: <ul style="list-style-type: none"> <li>Item 2 (Eligibility of transportation components of Sustainable Streets)</li> <li>Item 4 (Potential coordination of some application requirements with other grant programs)</li> <li>Item 6 (Match requirements)</li> </ul>
<b>2-1, Coordinate to publicize solicitations</b> - Coordinate with other agencies to join SWRCB in participating in funding fairs and the California Financing Coordinating Committee website	SWRCB	Other funding agencies	The coordination proposed in Specific Action 2-1 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 9 (Coordinate timing of solicitations)</li> </ul>
<b>2-2, Inform other agencies of solicitations</b> - Identify and add staff from applicable agencies to the list of parties to notify regarding schedules of future solicitations for applicable grant programs	Funding agencies, including SWRCB	None	The coordination proposed in Specific Action 2-2 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 9 (Coordinate timing of solicitations)</li> </ul>
<b>2-7, Consider linkages to other programs</b> - Funding agencies will consider aspects of other related grant programs (timing, criteria, etc.) in the development of future grant programs, and will coordinate with other grant programs where feasible	Funding agencies, including SWRCB	None	The considerations proposed in Specific Action 2-7 would address issues discussed in the following checklist item: <ul style="list-style-type: none"> <li>Item 4 (Potential coordination of some application requirements with other grant programs)</li> </ul>

# Appendix F

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VTA – See Santa Clara Valley Transportation Authority.

# Appendix G

## List of Participating Agencies and Organizations

Participating agencies and organizations are listed below, and includes the names of the representatives that attended Regional Roundtable meetings. Attendees<sup>6</sup> of this meeting provided comments on the Draft Roadmap that have been incorporated in the Final Roadmap.

Table G-1 Participating Agencies and Organizations	
Agency/Organization	Roundtable Attendance 9/19/2017
Alameda Countywide Clean Water Program	Jim Scanlin
BAAQMD	--
BASMAA	Geoff Brosseau
	Matt Fabry
Bay Area Metro   ABAG and MTC	Anne Richman
	Matt Maloney
	Mallory Atkinson
	Christy Leffal
Bay Area Regional Collaborative	--
Bay Conservation and Development Commission	Miriam Torres
California Natural Resources Agency	--
California Transportation Commission	Garth Hopkins
Caltrans	Jagjiwan Grewal
	Ephrem Meharena
	Tom Rutsch
California Stormwater Quality Association	Geoff Brosseau
City of Campbell	Fred Ho
City of Oakland	Ryan Russo
	Alison Schwartz

<sup>6</sup> Curt Kruger, of Contech, and Eric Zickler, of Lotus Water, also attended the September 19, 2017, Regional Roundtable meeting and commented on the Draft Roadmap.

Table G-1 Participating Agencies and Organizations	
Agency/Organization	Roundtable Attendance 9/19/2017
	Terri Fashing
	Bruce Wells
City of San Jose	--
City of San Pablo	Amanda Booth
City of Union City	Thomas Ruark
Contra Costa Clean Water Program	Rachel Kraai
Contra Costa County	Mary Halle
Contra Costa Transportation Authority	--
Department of Water Resources	Paul Wells
Federal Emergency Management Agency	--
Federal Highway Administration	--
Natural Resources Defense Council	Alisa Valderrama
Regional Water Quality Control Board	Thomas Mumley
	Keith Lichten
San Francisco Estuary Partnership	Josh Bradt
San Mateo City/County Association of Governments	Jean Higaki
San Mateo Countywide Water Pollution Prevention Program	Matt Fabry
San Mateo Transportation Authority	--
Santa Clara Urban Runoff Pollution Prevention Program	Jill Bicknell
Santa Clara Valley Transportation Authority	Eugene Maeda
Save the Bay	Allison Chan
SPUR	Laura Tam
State Coastal Conservancy/ San Francisco Bay Restoration Agency	Sam Schuchat
	Matt Gerhart
State Water Resources Control Board	Jeffrey Albrecht
	Meghan Tosney
Strategic Growth Council	--

<b>Table G-1 Participating Agencies and Organizations</b>	
<b>Agency/Organization</b>	<b>Roundtable Attendance 9/19/2017</b>
Trust for Public Land	Katherine Jones
U.S. Environmental Protection Agency	David Smith
	Luisa Valiela
	Erica Yelensky

**APPENDIX D**

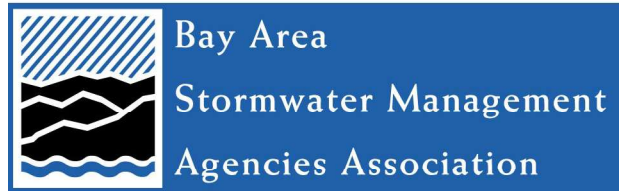
**GUIDANCE FOR SIZING GREEN INFRASTRUCTURE  
FACILITIES IN STREET PROJECTS**

***Guidance for Sizing Green Infrastructure  
Facilities in Street Projects***

with companion analysis:

***Green Infrastructure Facility Sizing for  
Non-Regulated Street Projects***

B A S M A A



Prepared by  
Dan Cloak Environmental Consulting  
EOA, Inc.

June 2019



## Introduction and Regulatory Background

Provision C.3.j. in the reissued Municipal Regional Stormwater Permit<sup>1</sup> (MRP) requires each Permittee to “complete and implement a Green Infrastructure (GI) Plan for the inclusion of low impact development drainage design into storm drain infrastructure on public and private lands, including streets, roads, storm drains, parking lots, building roofs, and other storm drain infrastructure elements.”

Provision C.3.j.i.(g) further mandates that these plans include:

*Requirements that projects be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d. For street projects not subject to Provision C.3.b.ii. (i.e., non-Regulated Projects) Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d. sizing requirements. The single approach can include different options to address specific issues or scenarios. That is, the approach shall identify the specific constraints that would preclude meeting the sizing requirements and the design approach(es) to take in that situation. The approach should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate, plus all other information as appropriate (e.g., how to account for load reduction for the PCBs or mercury TMDLs).*

This document represents the “single approach” collectively proposed by the Permittees for how to proceed when constraints on GI projects affect facility sizing in street projects. For other types of projects, information on hydraulic sizing is provided in the technical guidance manuals for Provision C.3 developed by each countywide stormwater program.

## Hydraulic Sizing Requirements

MRP Provision C.3.d contains criteria for sizing stormwater treatment facilities. Facilities may be sized on the basis of flow, volume, or a combination of flow and volume. With adoption of the 2009 MRP, a third option for sizing stormwater treatment facilities was added to Provision C.3.d. This option states that “treatment systems that use a combination of flow and volume capacity shall be sized to treat at least 80 percent of the total runoff over the life of the project, using local rainfall data.”

This option can also be used to develop sizing factors for facilities with a standard cross-section (i.e., where the volume available to detain runoff is proportional to facility surface area). To calculate sizing factors, inflows, storage, infiltration to groundwater, underdrain discharge, and overflows are tracked for each time-step during a long-term simulation. The continuous simulation is repeated, with variations in the treatment surface area, to determine the minimum area required for the facility to capture and treat 80% of the inflow during the simulation.

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<sup>1</sup> Order R2-2015-0049

Such an analysis was conducted for BASMAA by Dubin Environmental Consulting and is described in the attached Technical Report. The analysis shows that bioretention facilities with the current-standard cross-section can capture and treat the Provision C.3.d amount of runoff when sized to 1.5% - 3% of tributary equivalent impervious area, depending on location.

### **Hydromodification Management**

A principal objective of LID is to mimic natural hydrology in the post-development condition. This is accomplished by retaining and infiltrating runoff flows during small to medium events. Flows from larger events are detained and slowed.

MRP Provision C.3.g. includes requirements and criteria for implementing hydromodification management (HM). These HM requirements apply to Regulated Projects that create or replace an acre or more of impervious area, increase the amount of impervious area over the pre-project condition, and flow to creeks that are at risk of erosion. As such, the HM requirements do not apply to street projects that retrofit drainage systems that receive runoff from existing roofs and paving.

However, Provision C.3.j.i.(g) states that the Permittees' approach to sizing GI facilities "...should also consider whether a broad effort to incorporate hydromodification controls into green infrastructure, even where not otherwise required, could significantly improve creek health and whether such implementation may be appropriate..."

Various criteria for HM design have been used in California and throughout the U.S. These criteria have been based on one or more of the following principles:

- Maintaining watershed processes
- Maintaining a site-specific water balance
- Maintaining the value of the curve number used in the NRCS method of computing peak runoff
- Controlling increases in peak flows from a specified storm size
- Controlling increases in the duration of flows at each intensity within a specified range (flow duration control)
- Controlling the likelihood of downstream erosion in streams (erosion potential, or  $E_p$ )

Generally, for any HM criterion used, facilities with more storage and a larger infiltrative area will be more effective in meeting the criterion than facilities with less storage and a smaller infiltrative area.

In the statewide municipal stormwater NPDES permit for small MS4s, Provision E.12.f. includes the following HM standard applicable to Bay Area small MS4s: "Post-project runoff shall not exceed estimated pre-project flow rate for the 2-year, 24-hour storm..."

Dubin (2014) conducted modeling to evaluate whether this standard would be met in the San Francisco Phase II counties (Marin, Sonoma, Napa, and Solano) by a bioretention facility meeting the minimum requirements in that permit's Provision

E.12.f. Dubin's analysis found that a facility sized to 4% of tributary equivalent impervious area, and having a 6-inch deep reservoir with 2 inches of freeboard, 18 inches of treatment soil, and a 12-inch-deep "dead storage" gravel layer below the underdrain, would meet this standard, even in the wettest portions of the Bay Area.

### **Additional Considerations for Bioretention Sizing**

In summary, bioretention facilities for street projects sized to 1.5% - 3% of tributary equivalent impervious area (depending on their location in the Bay Area) can meet the criteria in Provision C.3.d., according to the modeling study documented in the attached Technical Memo.

There are many reasons to design and build facilities larger than the Provision C.3.d. minimum. Building larger facilities helps ensure the facilities perform to the minimum hydraulic capacity intended, despite minor flaws in design, construction, and maintenance, providing an engineering safety factor for the project. Further, larger-sized facilities may more effectively address objectives to maximize the removal of pollutants (particularly pollutants in dissolved form), to operate as full trash capture devices, and to manage hydromodification effects.

However, municipalities often face considerable challenges in retrofitting existing streetscapes with GI facilities. Constraints and design challenges typically encountered in the public right-of-way include:

- The presence of existing underground utilities (known and unknown during the design phase);
- The presence of existing above-ground fixtures such as street lights, fire hydrants, utility boxes, etc.;
- The presence of existing mature trees and root systems;
- The elevation of or lack of existing storm drains in the area to which to connect underdrains or overflow structures;
- Challenges of defining and controlling any catchment areas on adjacent private parcels that drain to the roadway surface;
- Low soil permeability and strength, and the need to protect the adjacent roadway structure;
- Competition with other assets & uses for limited right-of-way area; and
- Presence of archeologic/cultural deposits.

Use of the sizing factors in the attached Technical Memo will provide municipalities flexibility in design of bioretention facilities for street projects where constraints are present.

### **Recommendations for Sizing Approaches for Green Infrastructure Retrofit Facilities in Street Projects**

1. Bioretention facilities in street projects should be sized as large as feasible and meet the C.3.d criteria where possible. Constraints in the public right-of-way may affect the size of these facilities and warrant the use of smaller sizing factors.

Bioretention facilities in street projects may use the sizing curves in the attached memorandum to meet the C.3.d criteria. Local municipal staff involved with other assets in the public right of way should be consulted to provide further guidance to design teams as early in the process as possible.

2. Bioretention facilities in street projects smaller than what would be required to meet the Provision C.3.d criteria may be appropriate in some circumstances. As an example, it might be appropriate to construct a bioretention facility where a small proportion of runoff is diverted from a larger runoff stream. Where feasible, such facilities can be designed as “off-line” facilities, where the bypassed runoff is not treated or is treated in a different facility further downstream. In these cases, the proportion of total runoff captured and treated should be estimated using the results of the attached memorandum. In cases where “in-line” bioretention systems cannot meet the C.3.d criteria, the facilities should incorporate erosion control as needed to protect the facility from high flows. See Figures 1 and 2 below for illustration of the in-line and off-line concepts.
3. Pollutant reduction achieved by GI facilities in street projects will be estimated in accordance with the Interim Accounting Methodology<sup>i</sup> or the applicable Reasonable Assurance Analysis<sup>ii</sup>.



Figure 1: Off-line system in El Cerrito where low flow is diverted to the sidewalk planter and high flows continue down the gutter.



Figure 2: In-line system in Berkeley/Albany where low and high flows enter the system and overflows exit through a drain within the system.

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<sup>i</sup> The Interim Accounting Methodology for TMDL Loads Reduced Report (BASMAA 2017) describes the methodology that is being used to demonstrate progress towards achieving the PCB and mercury load reductions required during the term of MRP 2.0. The methodology is based on the conversion of land use from a higher to a lower PCB or mercury loading rate during the redevelopment of a parcel. See:

[www.waterboards.ca.gov/sanfranciscobay/water\\_issues/programs/stormwater/Municipal/POC/Final%20Interim%20Accounting%20Methodology%20Report%20v.1.1%20\(Revised%20March%202017\).pdf](http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/POC/Final%20Interim%20Accounting%20Methodology%20Report%20v.1.1%20(Revised%20March%202017).pdf)

<sup>ii</sup> A Reasonable Assurance Analysis (RAA) is a methodology used to demonstrate that implementation of pollutant control measures (such as GI facilities) over a specified time period will meet required pollutant load reductions associated with a TMDL. The Bay Area Reasonable Assurance Analysis Guidance Document (BASMAA 2017) establishes a regional framework and provides guidance for conducting PCBs and mercury RAAs in the San Francisco Bay Area. See: <http://basmaa.org/Announcements/bay-area-reasonable-assurance-analysis-guidance-document>

**BAY AREA  
STORMWATER MANAGEMENT AGENCIES  
ASSOCIATION**

**GREEN INFRASTRUCTURE  
FACILITY SIZING FOR NON-REGULATED STREET  
PROJECTS**

**Prepared by:  
Dubin Environmental  
December 13, 2017**

## 1. Introduction

The San Francisco Bay Regional Water Quality Control Board's reissued Phase I Municipal Regional Stormwater Permit (Order No. R2-2015-0049, issued 11/19/2015 and referred to as "MRP 2.0") includes a requirement that Permittees complete and implement green infrastructure plans to promote the increased use of green infrastructure in urban areas. These plans will guide the integration of green stormwater facilities into streets, parking lots, parks, building rooftops and similar places where there is an opportunity to retrofit traditional gray infrastructure systems and increase the removal of pollutants and improve water quality.

Provision C.3.j states:

*Over the long term, the (Green Infrastructure) Plan is intended to describe how the Permittees will shift their impervious surfaces and storm drain infrastructure from gray, or traditional storm drain infrastructure where runoff flows directly into the storm drain and then the receiving water, to green—that is, to a more-resilient, sustainable system that slows runoff by dispersing it to vegetated areas, harvests and uses runoff, promotes infiltration and evapotranspiration, and uses bioretention and other green infrastructure practices to clean stormwater runoff.*

Provision C.3.j.i.(2)(g) requires that projects be designed to meet the treatment and hydromodification sizing requirements in Provisions C.3.c. and C.3.d. However, the provision further states that for street projects that are not Regulated Projects:

*...Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d sizing requirements. The single approach can include different options to address specific issues or scenarios. That is, the approach shall identify the specific constraints that would preclude meeting the sizing requirements and the design approach(es) to take in that situation.*

To address this provision and further define the C.3.d sizing requirements for green infrastructure projects, the Bay Area Stormwater Management Agencies Association (BASMAA) contracted with Dubin Environmental to conduct continuous simulation hydrologic modeling to evaluate relationships of facility size (e.g., area, depth, flow rate) to facility performance. The BASMAA Development Committee, and BASMAA member agencies, intend to use these relationships to develop and justify an approach, to be created by the Development Committee, for implementing green street projects when there are constraints on facility size.

This report describes the modeling analysis that was performed to better understand the relationship between bioretention configuration and annual runoff treatment across the different BASMAA stormwater agencies and their climate zones. Long-term continuous modeling was used to compute stormwater runoff, simulate bioretention hydraulics, and estimate the annual percentage of stormwater that is treated. The analysis was performed for 10 different rain gauges that together represent the full range of climate conditions across the BASMAA member agency area. The analysis also considered different bioretention configurations and treatment goals. BASMAA member agencies can use these results to help establish policies and design guidelines to include in their green infrastructure plans.

## 2. Project Approach

The performance of bioretention facilities was modeled using HSPF (Hydrologic Simulation Program Fortran), which is a physically based, hydrologic model that is maintained and distributed by the US EPA.



HSPF has been used since the 1970s to conduct hydrologic analyses and size stormwater and flood control facilities. For this project, an HSPF model was developed to simulate runoff from a fully paved, 1-acre reference site and route this flow through a bioretention facility. This section describes the rain gauge selection and the HSPF modeling approach. Section 3 describes the modeling results.

## 2.1 Rainfall and Evapotranspiration Data

There are more than two dozen rain gauges with long-term, hourly data located within the BASMAA area. A list of candidate gauges was prepared from the National Center for Environmental Information (NCEI; formerly the National Climate Data Center or NCDC) network and then evaluated for inclusion. The evaluation focused on gauge data that could be downloaded directly from EPA’s National Stormwater Calculator, because these datasets have been reviewed and missing records filled with data from available nearby stations (similar to the data included with the EPA BASINS software). The list of candidate gauges was narrowed to 19 locations with 35+ years of data that are geographically distributed through the BASMAA area. The rain gauges were organized into tables that show a) mean annual precipitation (MAP) and b) 6-month, 1-year, and 2-year accumulations for 1-year and 24-hour durations. The different storm depth statistics were used to identify any outliers among the rain gauge data that could indicate problems that would hinder the effort to create regressions among the model results. The rain gauge locations were also plotted in ArcGIS.

The recommended sites were presented to the BASMAA project work group who provided helpful input about their preferences and experiences with different rain gauges. Based on this input, six stations were selected for inclusion in the modeling analysis. After developing the HSPF input and output routines, the number of gauges was increased to 10 by including higher rainfall locations to allow development of regression relationships that span the rainfall characteristics at any likely project location. Table 1 lists the candidate rain gauges included in the modeling analysis. For all gauges, a common 37 year period was used to eliminate the influence of drought and wet periods that occurred when some gauges were operational but not others. Figure 1 shows the mean annual rainfall and Figure 2 shows their locations. The 1-year and 24-hour storm durations are included in Appendix A.

TABLE 1. SELECTED RAIN GAUGES FOR GREEN INFRASTRUCTURE MODELING

<b>2</b>	<b>Name</b>	<b>County/Agency</b>	<b>Years of Record</b>	<b>Mean Annual Rain (in)</b>
049001	Tracy Pumping Plant	Contra Costa	37	12.7
047821	San Jose	Santa Clara	37	15.2
045378	Martinez Water Plant	Contra Costa	37	19.6
047769	SF Airport	San Francisco	37	20.4
047772	SF Downtown	San Francisco	37	21.9
046336	Oakland Museum	Alameda	37	22.8
042934	Fairfield	Fairfield-Suisun	37	24.1
043714	Half Moon Bay	San Mateo	37	28.6
047807	San Gregorio	San Mateo	37	30.0
044500	Kentfield	Marin	37	48.1

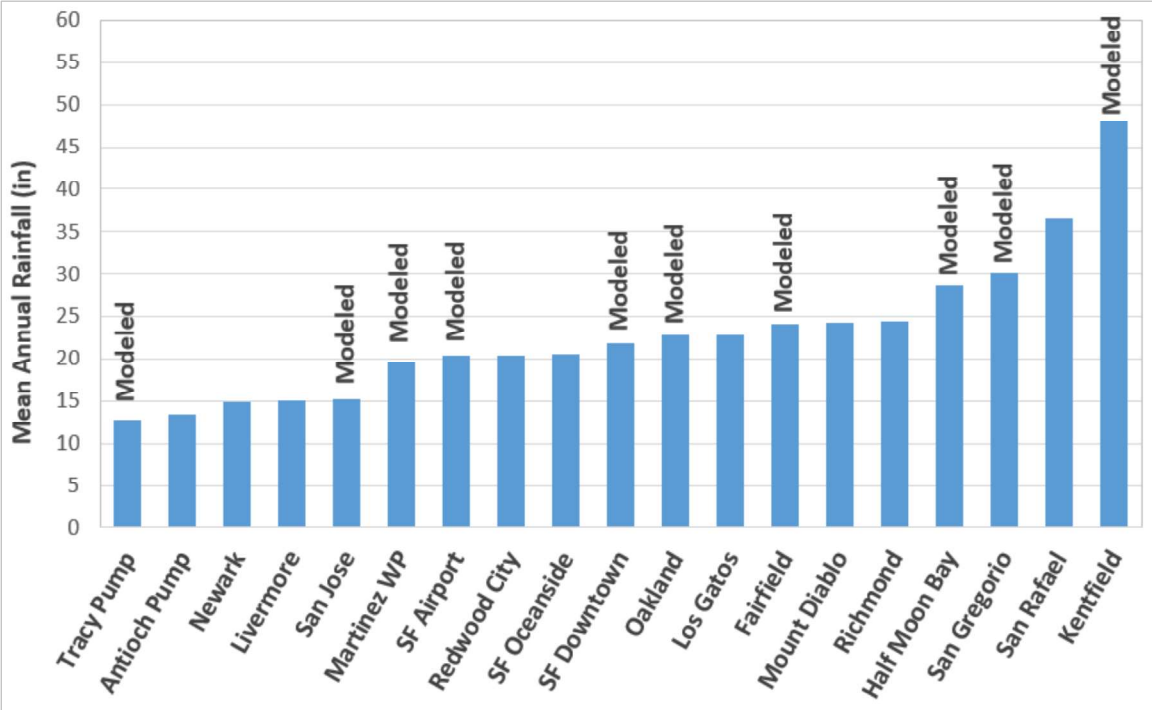


Figure 1. Candidate and selected rainfall sites with mean annual rainfall

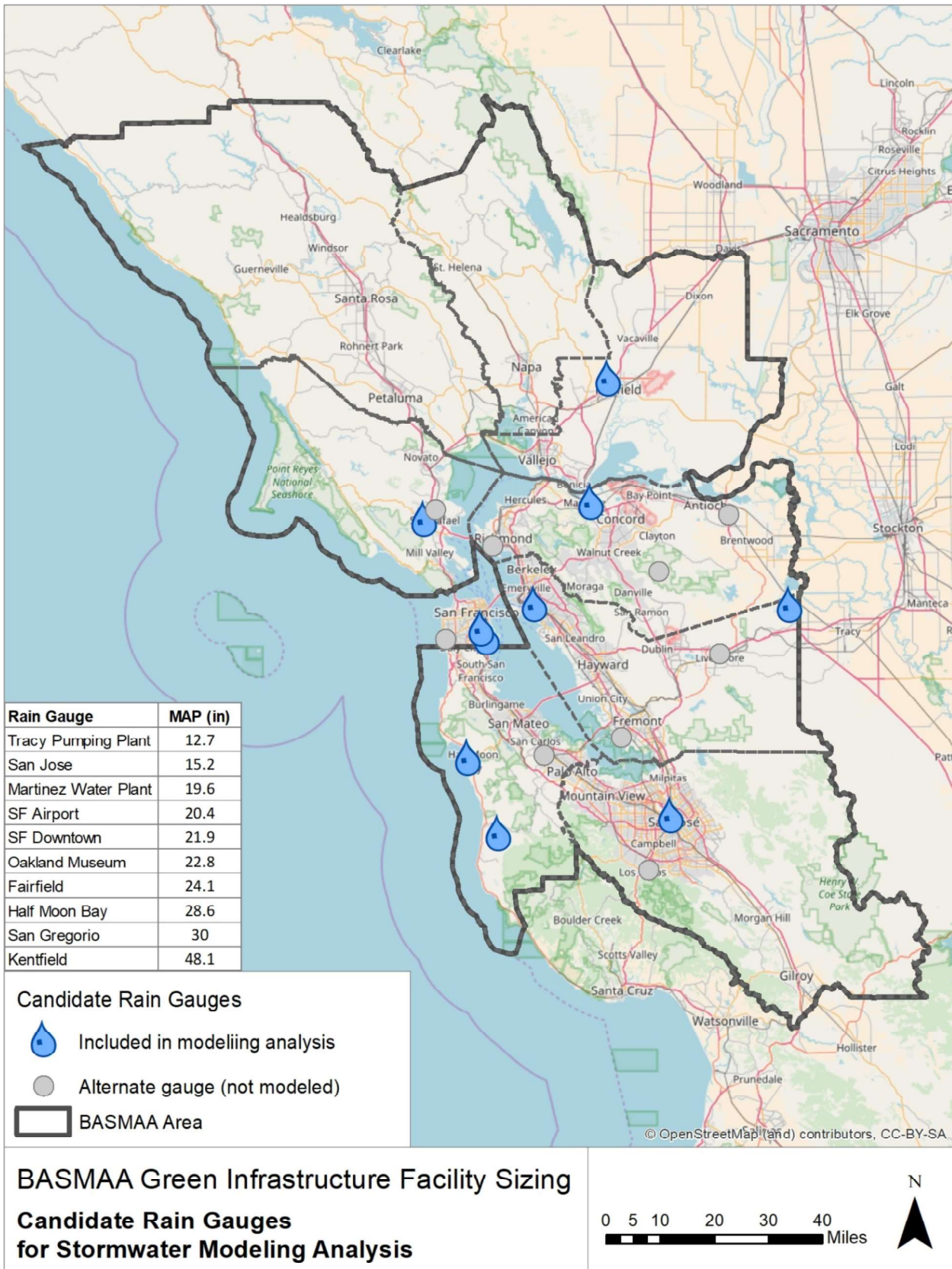


Figure 2. Location of rain gauges used in the modeling analysis

## 2.2 HSPF Model Setup

An HSPF model was developed to simulate runoff from a fully paved, 1-acre reference area and route this flow through a bioretention facility. The model outputs were then evaluated to determine the fraction of incoming stormwater receiving water quality treatment (defined as the fraction filtered through the bioretention media, evaporated or transpired). The HSPF model was developed with Excel/VBA-based code that enabled us to easily modify the rain gauge, bioretention area, and surface reservoir depth to determine how these watershed and configuration parameters affect the fraction of stormwater being treated.

The model parameters and approach to simulating bioretention hydraulics are discussed in detail below:

- Stormwater runoff flows across the reference 1-acre paved area and enters the bioretention facility. This water is initially detained in a shallow surface reservoir and then infiltrates to the bioretention media.
- Stormwater infiltrates through the bioretention media into an underlying gravel layer. The saturated soil permeability was set to 5 inches per hour (based on the media specification). For unsaturated soils, the relationship between soil moisture and permeability was based on monitoring data collected at three installations in Pittsburg (Contra Costa, 2013). The data showed very little infiltration occurs until the soil reaches about two-thirds saturation, and then infiltration increases roughly linearly until reaching 5 inches per hour at 90 percent saturation. Evapotranspiration also occurs in this layer.
- Stormwater within the gravel layer can move freely and infiltrate to surrounding soils, based on their capacity. If runoff enters the gravel layer more rapidly than it infiltrates, the saturation level in the gravel layer will rise until it reaches the elevation of a perforated pipe underdrain. When this occurs, water will flow through the underdrain to a downstream discharge point (typically the municipal storm drainage system).
- The surface reservoir is also equipped with an overflow structure that will become active if runoff enters the surface reservoir more rapidly than it infiltrates through the bioretention media and the surface reservoir fills to its maximum depth. Water discharged via the overflow relief structure does not receive treatment.

The bioretention configuration was based on the water quality treatment design criteria listed in the MRP 2.0 and accepted design practice in the Bay Area. Table 2 lists the dimensions of the bioretention layers as modeled in HPSF.

TABLE 2. BIORETENTION CHARACTERISTICS IN HSPF MODEL

Component	Characteristics
Surface reservoir	<ul style="list-style-type: none"> <li>• Area = bioretention area (varies from 0.5% to 5% of upstream impervious area)</li> <li>• Depth = 6 or 12 inches with overflow relief set 2 inches from top of reservoir</li> </ul>
Bioretention soil media	<ul style="list-style-type: none"> <li>• Area = bioretention area</li> <li>• Depth = 18 inches</li> <li>• Saturated permeability = 5 inches per hour</li> <li>• Unsaturated permeability = variable, based on Contra Costa’s 2013 monitoring data</li> </ul>
Storage (gravel) layer	<ul style="list-style-type: none"> <li>• Area = bioretention area</li> <li>• Depth = 12 inches</li> <li>• Permeability of surrounding soils = 0.024 inches per hour</li> </ul>
Underdrain	<ul style="list-style-type: none"> <li>• Located at top of gravel layer</li> <li>• Assumed 4-in diameter pipe</li> </ul>

## 2.3 Model QA/QC Process

The HSPF input files and initial model results were carefully examined during the QA/QC process. Model errors and warnings were systematically eliminated and then the results were compared with the results generated from three independent calculation methods:

1. An Excel-based bioretention hydraulics calculator
2. A Matlab-based bioretention algorithm that was used for bioretention modeling in the Central Coast region
3. An EPA SWMM model using the LID module to represent bioretention hydraulics

The comparison was performed for the San Jose and Fairfield gauges with a bioretention sizing factor of 0.02 (i.e., bioretention surface area equal to 2 percent of the upstream impervious area). The estimated annual runoff treatment percentages agreed to within 3 percent, which confirmed the HSPF model was performing as intended.

## 3. Modeling Scenarios and Results

The HSPF modeling analysis was used to develop bioretention sizing criteria and support policy decisions. Working collaboratively with the BASMAA Development Committee, the modeling analysis addressed the following issues, which are presented in this section:

1. Bioretention area necessary to treat 80 percent of annual stormwater runoff
2. Relationships for estimating annual stormwater treatment percentage across a range of bioretention sizes and mean annual precipitation depths
3. Relationships for estimating annual stormwater treatment percentage for bioretention facilities without an underdrain
4. Bioretention treatment percentage for facilities with no infiltration to surrounding soils
5. Bioretention treatment percentage for facilities with lower bioretention media permeability

The results are summarized graphically here. The full set of results and underlying data were provided separately to the BASMAA Development Committee on 7/28/2017 and are available from BASMAA upon request.

### 3.1 Bioretention Sizing for Treatment of 80 Percent of Annual Runoff

The performance of bioretention facilities was modeled for 10 different rain gauges and bioretention footprint areas, ranging from 0.5 to 5.0 percent of the upstream tributary area, using the approach described in Section 2. Bioretention configurations with 6-inch and 12-inch deep surface reservoirs were modeled. For each of the model runs, the runoff treatment percentage was computed, and the results were plotted. Figure 3 shows an example for the San Jose gauge. Appendix B shows results for the other rain gauges.

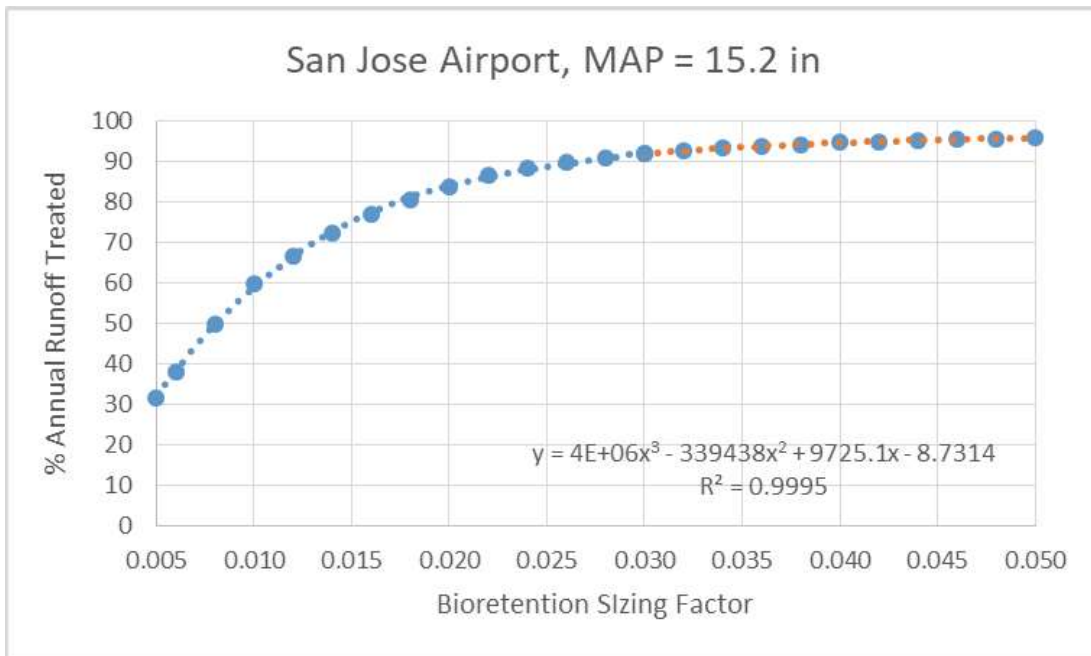


Figure 3. Percent of annual runoff treated for range of bioretention facility sizes using San Jose rain gauge

Using a polynomial regression equation, the model results for each rain gauge/surface reservoir depth scenario were interpolated to estimate the bioretention sizing factor needed to provide 80 percent annual runoff treatment, which is the treatment criterion for regulated water quality projects in the MRP 2.0. The results across the 10 rain gauges showed a clear linear relationship between mean annual rainfall and the bioretention footprint needed for 80 percent annual runoff treatment. Figure 4 and Figure 5 show the results for the 6-inch and 12-inch surface reservoir configurations, respectively.

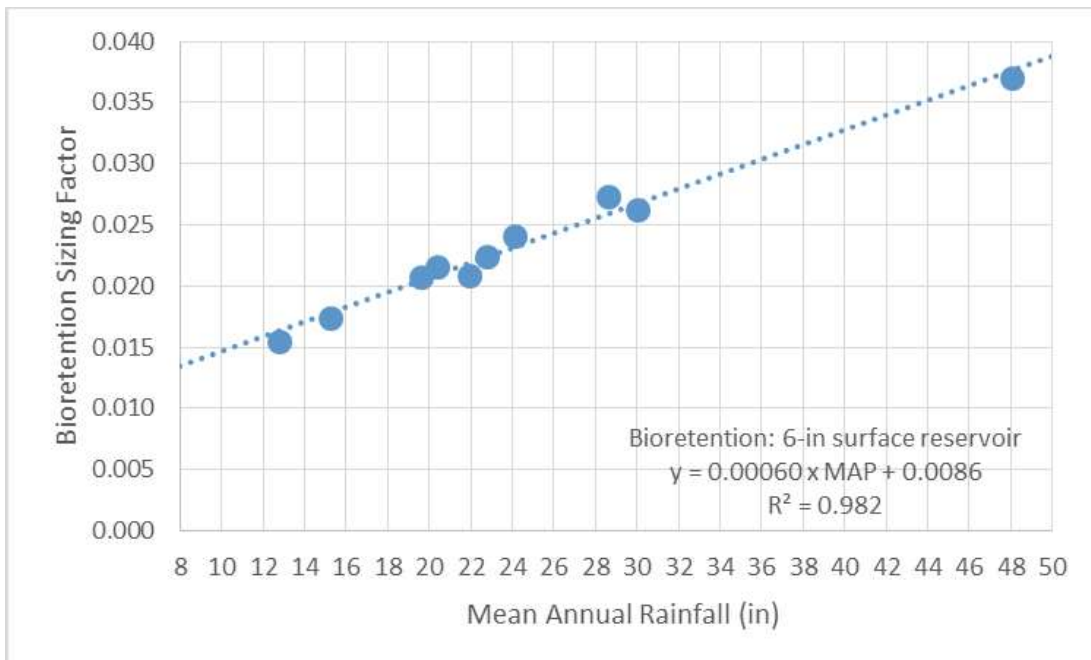


Figure 4. Bioretention size needed to provide treatment of 80 percent of annual runoff; 6-in surface reservoir

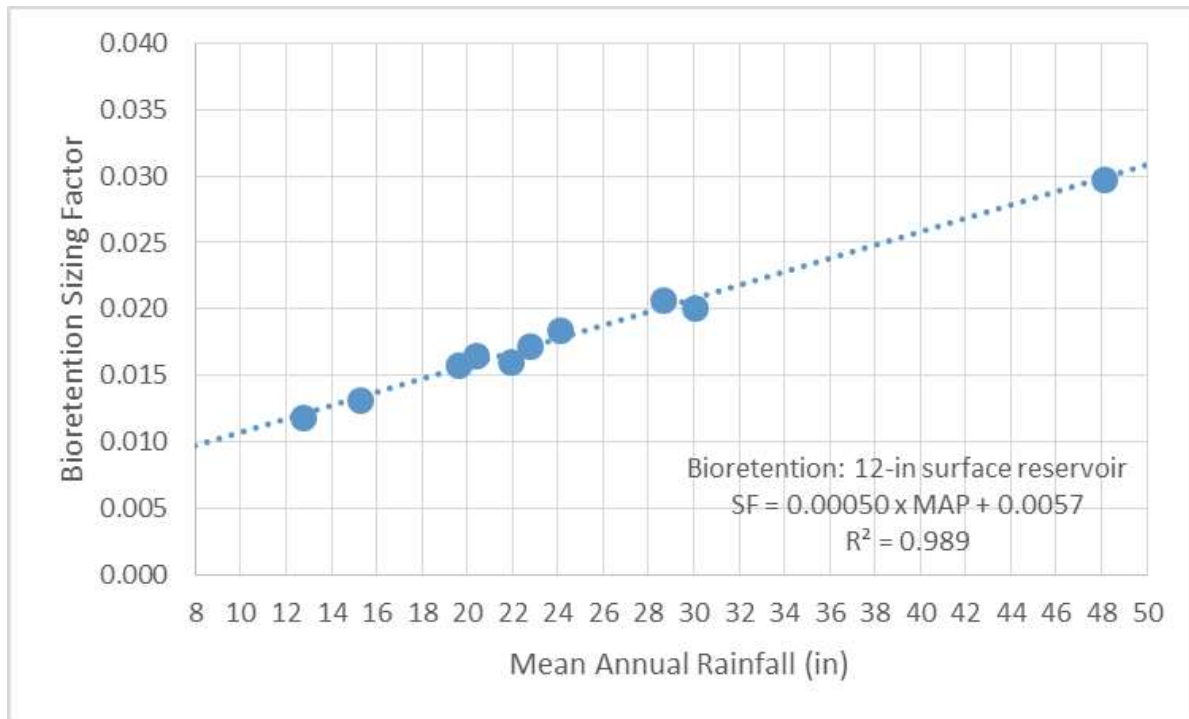


Figure 5. Bioretention size needed to provide treatment of 80 percent of annual runoff; 12-in surface reservoir

The results shown above could be used by BASMAA agencies to set minimum bioretention sizing criteria for projects that must provide treatment of 80 percent of annual runoff. The following equations could be included in BASMAA guidance for green infrastructure manuals.

For bioretention with 6-in surface reservoir configuration:

$$SizingFactor = 0.00060 \times MAP(in) + 0.0086$$

For bioretention with 12-in surface reservoir configuration:

$$SizingFactor = 0.00050 \times MAP(in) + 0.0057$$

### 3.2 Relationship Among Bioretention Sizing, Annual Precipitation, and Percent of Annual Runoff Treated

The modeling results generated in the previous section were then further evaluated to develop more general relationships among a) bioretention sizing factor, b) mean annual rainfall, and c) annual runoff treatment percentages. The following steps were used for the 6-inch and 12-inch reservoir depth configurations:

1. A polynomial regression was fit to the annual runoff treatment results for each of the 10 rain gauges (see example in Figure 3 above) and surface reservoir depths of 6 and 12 inches.
2. For each rain gauge/surface reservoir depth combination, the regression equation was used to estimate the sizing factors needed to provide 50, 60, 70, 80, 90, and 95 percent annual runoff treatment. This step generated 10 pairs of mean annual rainfall/bioretention sizing factor data for each rain gauge/surface reservoir depth combination (120 pairs in total). Excel’s solver function was used for these calculations.



3. For each runoff treatment percentage level (50 percent, 60 percent, etc.), the mean annual rainfall (x-axis) and computed sizing factor (y-axis) were plotted and a linear regression was fit to the data in a manner similar to Figure 4 and Figure 5 above.
4. The linear regressions created for each runoff treatment level (50 percent, 60 percent, etc.) and surface reservoir depth were then plotted together to create a nomograph. Figure 6 and Figure 7 show nomographs for the 6-inch and 12-inch reservoir depths, respectively.

These nomographs are simple but powerful tools that municipal planners can use to estimate the annual treatment percentage for any bioretention facility within the BASMAA member agency area that uses the standard bioretention configuration (i.e., 6-in or 12-in reservoir, 18-in soil media, 12-in gravel layer, underdrain at top of gravel layer). The nomographs should be read as follows:

Step 1: Find the mean annual rainfall for the project location along the horizontal axis

Step 2: Move vertically up the chart to the bioretention sizing factor for the project/installation (note: this step assumes the tributary impervious area and bioretention area have already been planned)

Step 3: Visually interpolate between the closest two “treatment lines” to estimate the percent of annual runoff treated for this location/project.

These nomographs and instructions could be included in BASMAA guidance for green infrastructure manuals and used to a) evaluate the water quality benefits of proposed projects or b) evaluate the treatment provided by existing facilities with the layer depths described above.

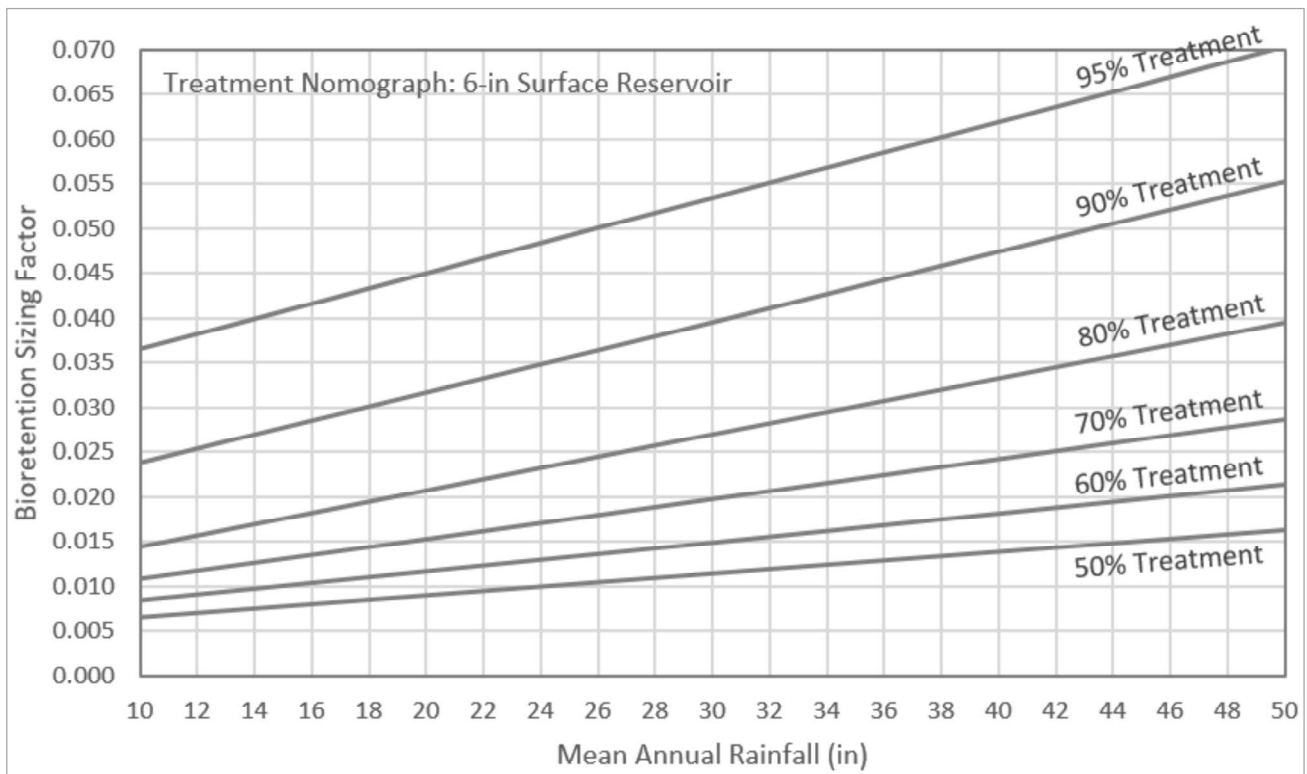


Figure 6. Percent of annual runoff treatment nomograph for bioretention facility with 6-in surface reservoir



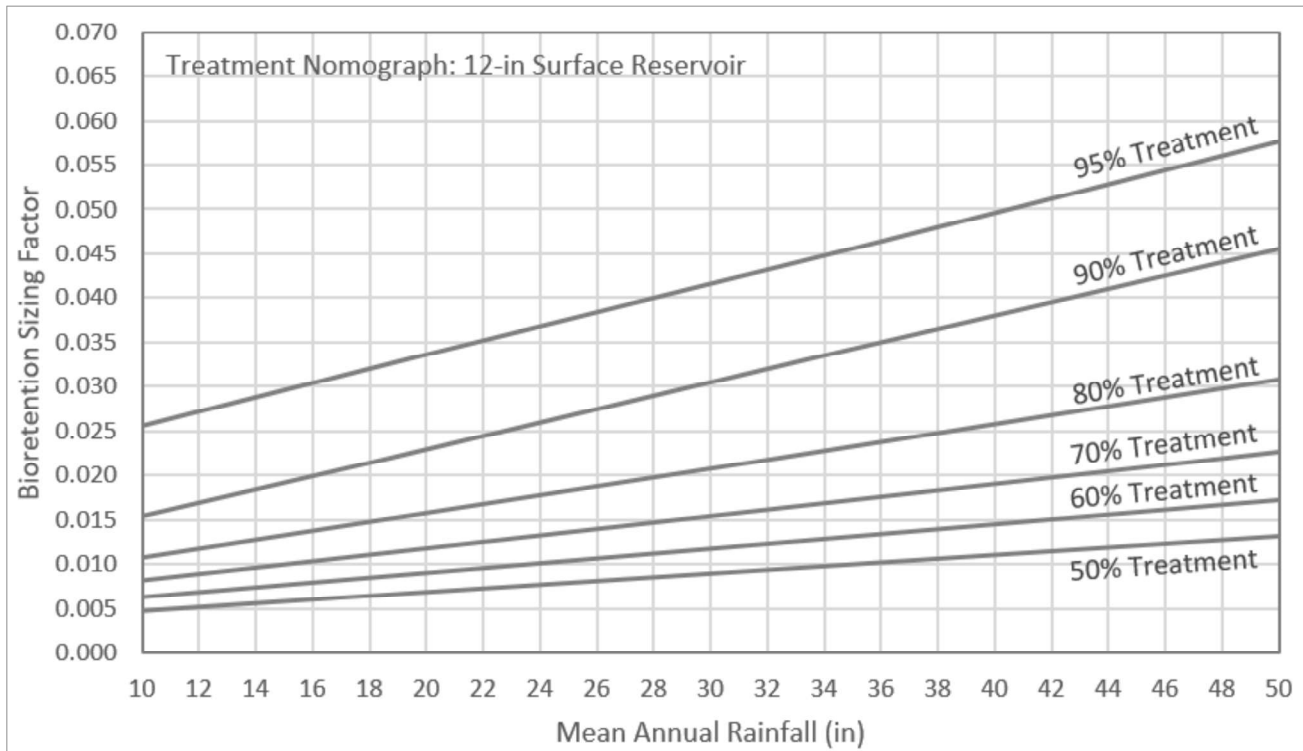


Figure 7. Percent of annual runoff treatment nomograph for bioretention facility with 12-in surface reservoir

### 3.3 Percent of Annual Runoff Treated by Bioretention Facilities with No Underdrain

Bioretention facilities are occasionally designed with no underdrain, including bioretention facilities in the following conditions:

- High permeability of surrounding (native) soils
- Isolated projects with no downstream drainage system for the underdrain connection
- Small projects that would not justify the additional design and construction costs associated with underdrains and cleanouts
- Projects that were designed and built prior to the development of the current standards

The HSPF model setup was modified to eliminate the underdrain outflows and allow the permeability of the surrounding soils to vary. The annual runoff treatment percentage was computed for a) three rain gauges representing drier, average and wetter than average conditions, b) six rates of permeability of surrounding soils, and c) two bioretention surface reservoir depths (Table 3).

TABLE 3. BIORETENTION WITH NO UNDERDRAIN SCENARIOS

Component	Characteristics
Rain gauges	<ul style="list-style-type: none"> <li>• San Jose (MAP = 15.2 in)</li> <li>• San Francisco Airport (MAP = 20.4 in)</li> <li>• Fairfield (MAP = 24.1 in)</li> </ul>
Permeability of surrounding (native) soils	<ul style="list-style-type: none"> <li>• 0.2, 0.5, 1.0, 2.0, 3.0, 4.0 inches per hour</li> <li>• Underdrain results also plotted</li> </ul>

TABLE 3. BIORETENTION WITH NO UNDERDRAIN SCENARIOS

Component	Characteristics
Surface reservoir depths	<ul style="list-style-type: none"> <li>Depth = 6 inches</li> <li>Depth = 12 inches</li> </ul>
Bioretention sizing factors	<ul style="list-style-type: none"> <li>Area = 0.5% to 5.0% of upstream impervious acre</li> </ul>

Figure 8, Figure 9 and Figure 10 show the modeled annual runoff treatment results for the three rain gauges and a surface reservoir depth of 6 inches. Results for the 12-inch surface reservoir are shown in Appendix C. For rates of permeability of 4 inches per hour, there is little drop off in performance. The annual runoff treatment percentage declines gradually between rates of permeability of 2 to 4 inches per hour and then declines more rapidly for rates of permeability of 1 inch per hour or less. The reduction in performance is more pronounced in wetter areas (as seen in the Fairfield results). These results could be incorporated into the BASMAA guidance for green infrastructure manuals to assess the general performance of existing facilities that were installed with no underdrain.

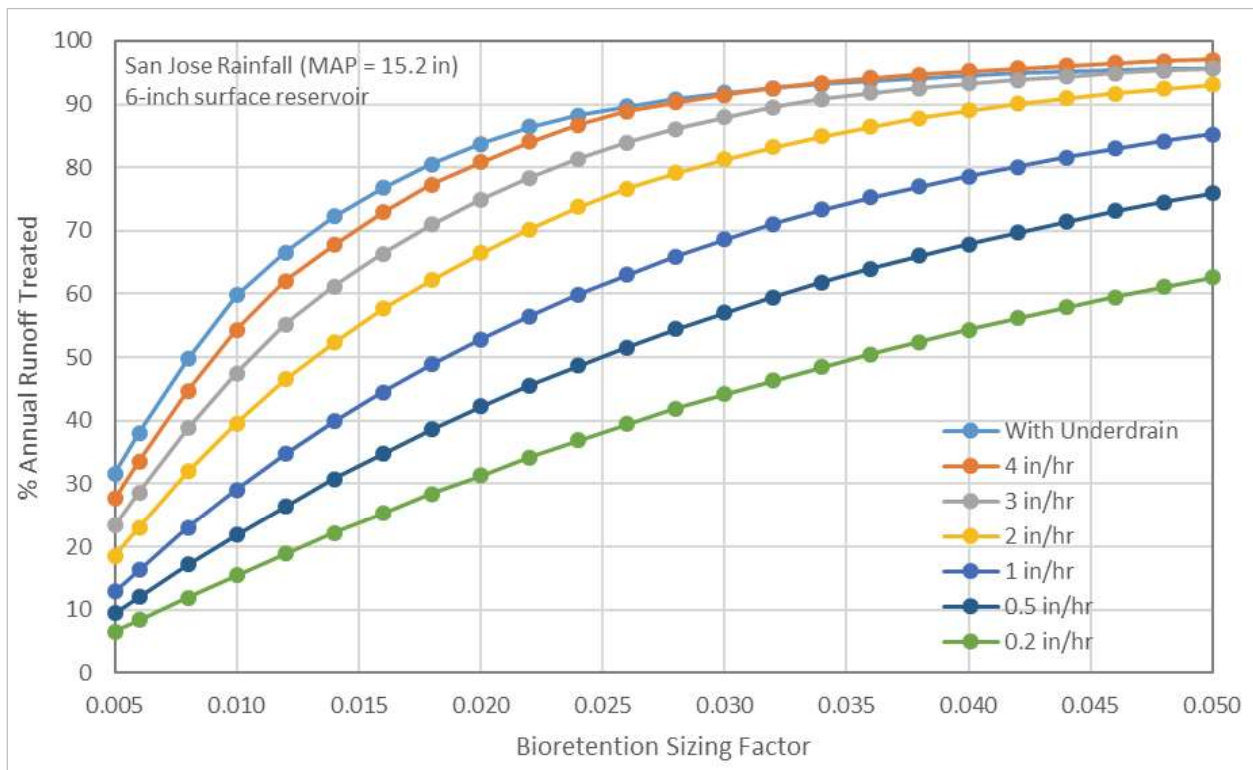


Figure 8. Treatment results for bioretention with no underdrain, San Jose gauge (MAP = 15.2 in), for varying rates of permeability of surrounding soils

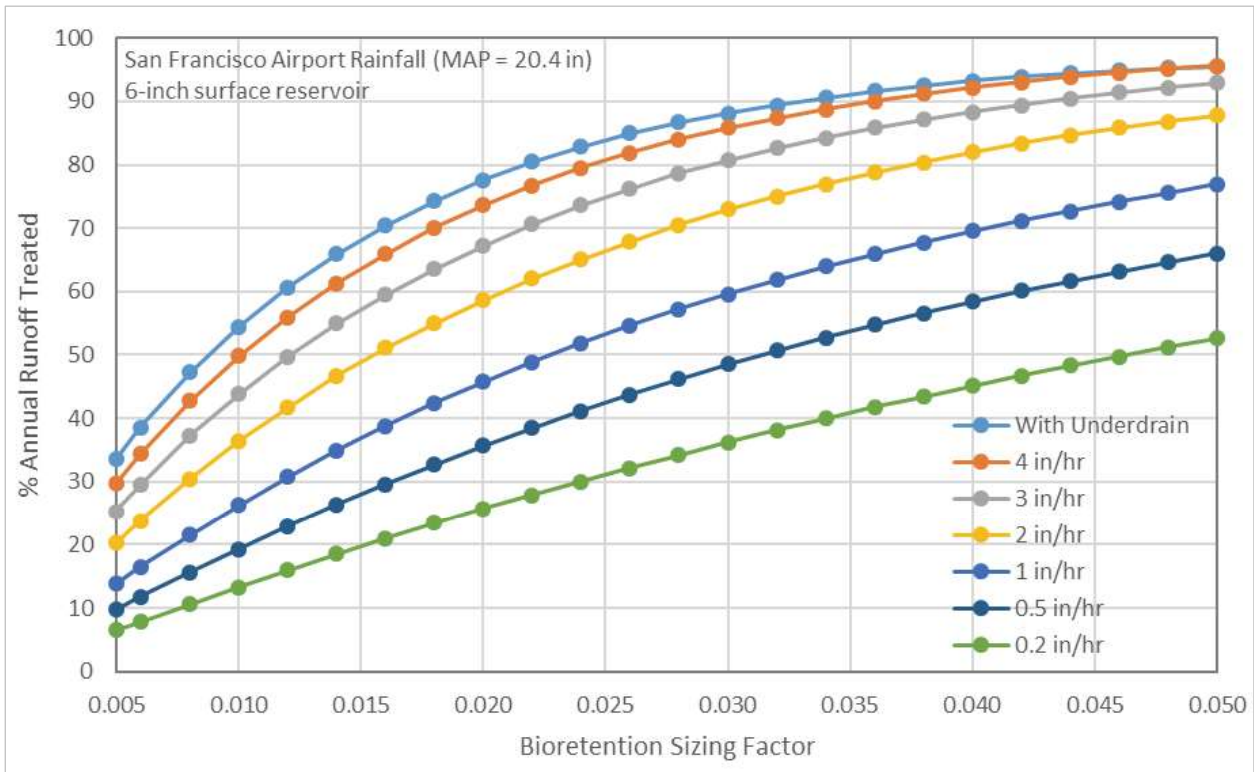


Figure 9. Treatment results for bioretention with no underdrain, San Francisco Airport gauge (MAP = 20.4 in), for varying rates of permeability of surrounding soils

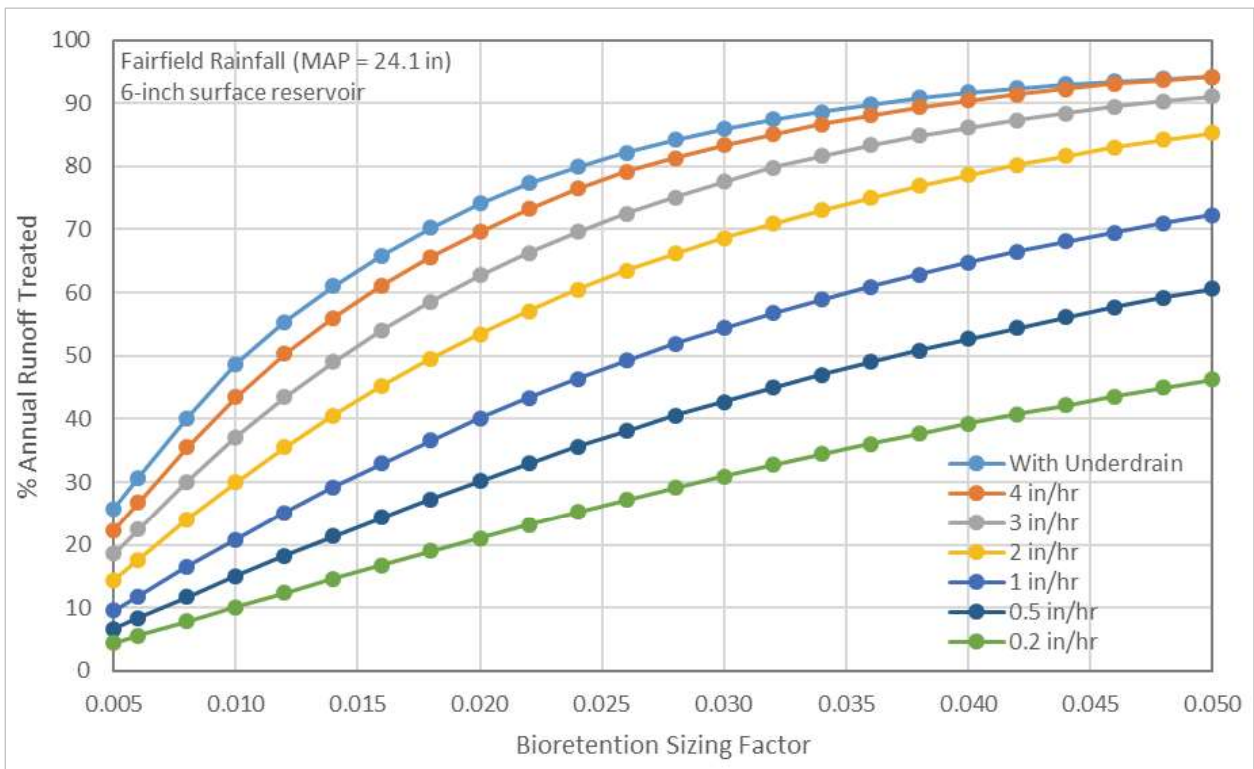


Figure 10. Treatment results for bioretention with no underdrain, Fairfield gauge (MAP = 24.1 in), for varying rates of permeability of surrounding soils

### 3.4 Percent of Annual Runoff Treated for Bioretention Facilities with No Infiltration to Surrounding Soils

The previous simulations described in Sections 3.1 and 3.2 were conducted for bioretention facilities located in NRCS hydrologic soil group D soils, which are low permeability soils, such as clays. These model simulations used a conservative permeability of 0.024 inches per hour from the bioretention gravel layer to surrounding soils. It was assumed the permeability of surrounding soils would have a negligible effect on the results because the hydraulic capacity of the underdrain is much higher than the permeability of D soils and that when the bioretention media becomes saturated, stormwater would exit mostly via the underdrain. If this assumption is correct, a lined bioretention facility or flow-through planter with no infiltration into surrounding soils should have similar performance.

This assumption was tested directly by running a limited number of simulations with the permeability of the surrounding soils set to a value of zero (i.e., an impervious layer directly below the bioretention facility). The annual treatment percentages were then compared to the previous modeling results (with D soil permeability set to 0.024 inches per hour). These simulations were performed for the Fairfield rain gauge and a bioretention facility with a 6-inch surface reservoir for sizing factors ranging from 0.005 to 0.050.

Figure 11 shows the two sets of model results. For the impermeable bottom scenario, the annual treatment percentage was on average 0.8 percent less the scenarios with a D soil permeability of 0.024 inches per hour (minimum difference = 0.4 percent; maximum difference = 1.5 percent). Therefore, the sizing curves and nomographs in Figure 4 through Figure 7 can be used for lined facilities with no infiltration.

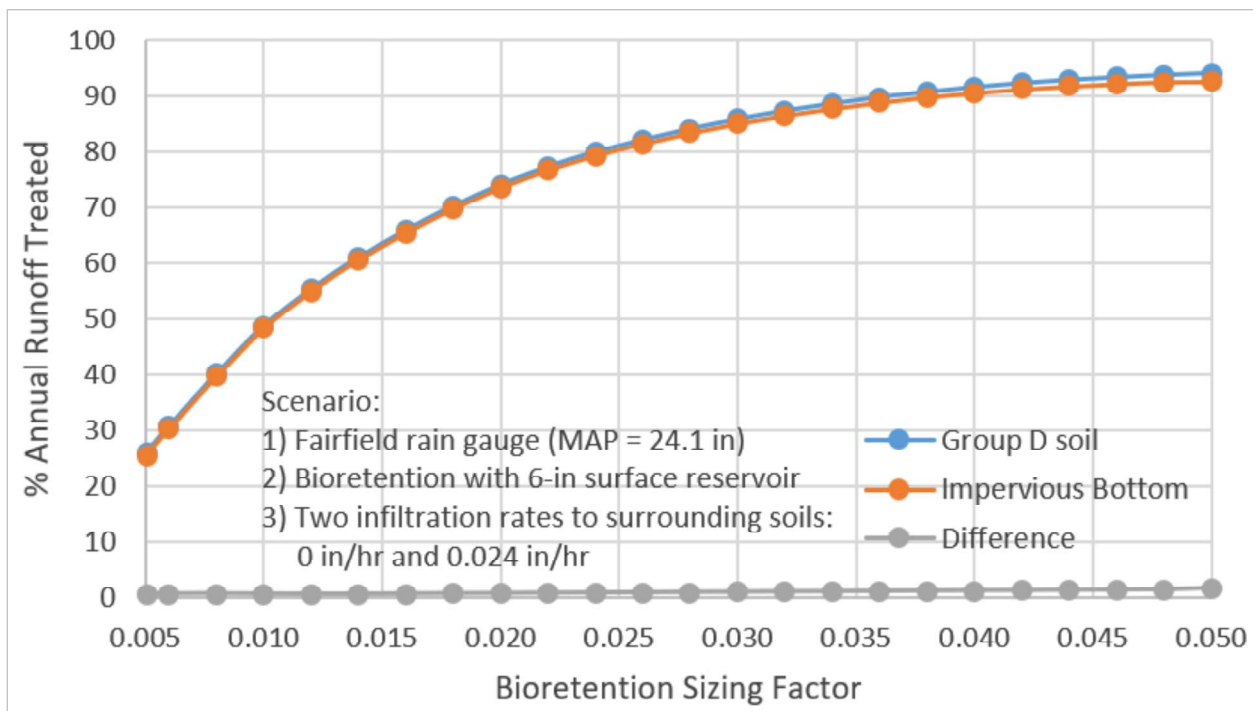


Figure 11. Comparison of model results for Group D soils and impermeable bottom scenarios

### 3.5 Percent of Annual Runoff Treated for Bioretention Facilities with Lower Media Permeability

The final modeling analysis examined the effect of modifying the bioretention media properties to reduce its saturated permeability from 5 inches per hour to 2 or 3 inches per hour. A lower permeability media would expand the list of available plantings and provide additional flexibility for landscape designers. However, the lower permeability would also reduce the bioretention’s capacity for treating runoff during intense storms.

Due to budgetary constraints, this modeling analysis was limited to two scenarios: San Jose rain gauge, 6-inch surface reservoir depth, sizing factors ranging from 0.005 to 0.05, and saturated bioretention media permeability of 2 and 3 inches per hour. Figure 12 shows the percentage of annual runoff treated across the range of bioretention sizing factors and permeability rates. All of the scenarios include an underdrain, so the media permeability is the facility characteristic that controls the treatment percentage (i.e., the rate limiting step). The reduction in treatment percentage could be significant, particularly for smaller facilities. For example, the percent of annual runoff treated for a bioretention facility with a sizing factor of 0.02 would be reduced from 84 percent to 74 or 65 percent (for media permeability rates of 3 and 2 inches per hour, respectively).

Another way to consider the effect of lower media permeability is to estimate *how much larger a facility would need to be* to treat 80 percent of annual runoff. For the San Jose gauge, a sizing factor of 0.017 is needed with the standard bioretention media specification. If the media permeability were reduced to 3 or 2 inches per hour, the sizing factor needed to treat 80 percent of annual runoff would be 0.024 or 0.030, respectively, which represents a 37 to 75 percent increase in the facility footprint.

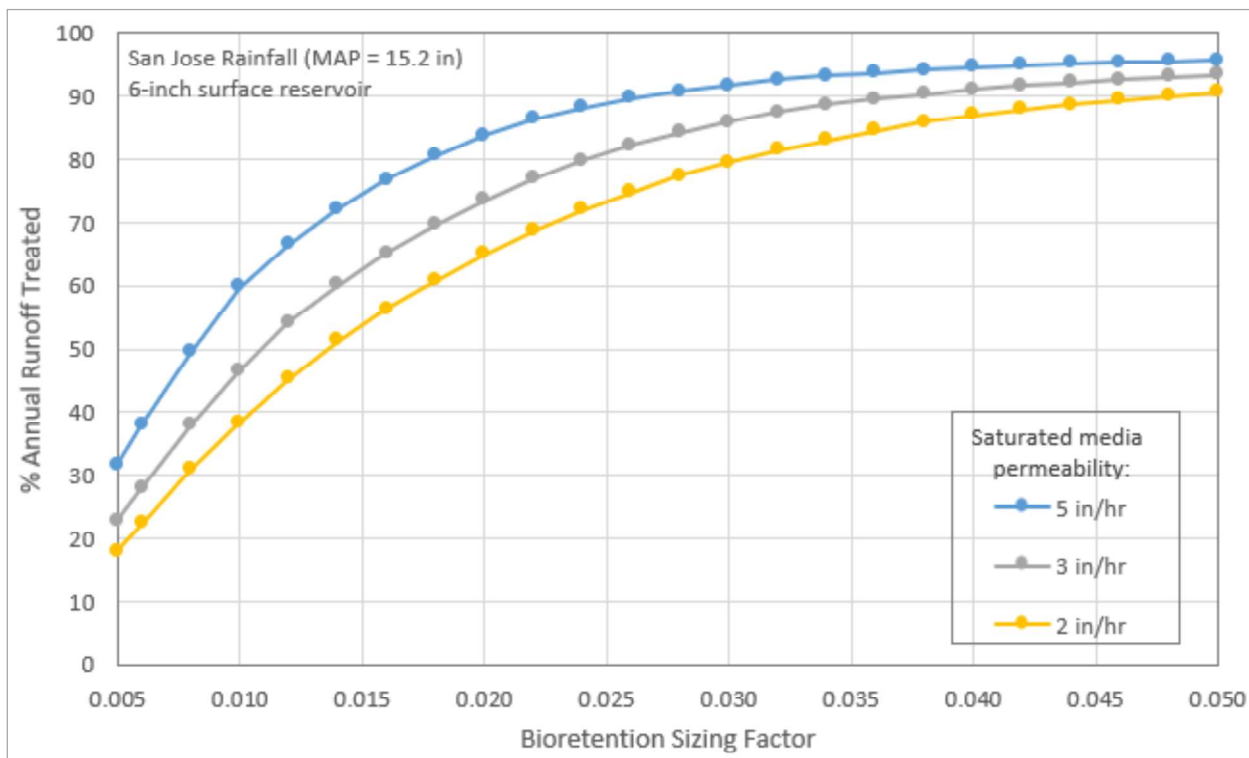


Figure 12. Treatment results for bioretention with variable media permeability, San Jose gauge (MAP = 15.2 in)

As a final note, the media permeability modeling was limited to two scenarios (one rain gauge, one facility configuration, two permeability rates). However, these results could be extended by noting that they are

generally similar to the “no underdrain” results shown in Section 3.3 (e.g., comparing the results for a media permeability of 2 inches per hour to a 2-inch per hour permeability of surrounding soil). When comparing the two sets of results, the percent of annual runoff treated for the lower media permeability is a little lower (0.5 to 2.5 percent) than the corresponding “no underdrain” scenario and the shape of the curve in Figure 12 is similar to the Figure 8 in Section 3.3.

## 4. Summary and Conclusions

Bioretention facilities are a useful and flexible approach for improving stormwater quality in urban areas. This project developed a set of useful tools that will help municipal staff plan green infrastructure projects in constrained public rights-of-way and assess the effectiveness of existing facilities.

### 1. Bioretention Sizing Criteria for 80 Percent Annual Runoff Treatment

The modeling analysis in Section 3.1 showed that bioretention facility performance is closely related to mean annual rainfall. For most locations, the bioretention area necessary to treat 80 percent of annual stormwater ranges from 1.5 to 2.5 percent of the connected upstream impervious area. The precise bioretention area necessary for any project within the BASMAA area (under the guidelines to be developed by BASMAA) can be calculated using the regression equations in Section 3.1.

### 2. General Sizing Relationships that Apply Throughout the BASMAA Area

The modeling analysis in Section 3.2 developed nomographs that estimate the annual stormwater treatment percentage across a range of bioretention facility sizes and mean annual rainfall depths. These nomographs can be used to estimate the annual treatment percentages for retrofit projects with space constraints and will enable municipal staff to compare bioretention with other treatment technologies. These nomographs can also be used to assess the effectiveness of existing facilities.

### 3. Performance of Bioretention Facilities with No Underdrain and Varying Rates of Permeability of Surrounding Soils

The modeling analysis in Section 3.3 demonstrated the relationship between stormwater treatment percentage and level of permeability of surrounding soils for bioretention facilities without an underdrain. Graphics were developed for rain gauges in wetter and drier areas. The results of this analysis can help assess existing installations and also inform designers about the benefits and tradeoffs of constructing bioretention with no underdrain.

### 4. Performance of Bioretention Facilities with No Infiltration

The modeling analysis in Sections 3.1 and 3.2 included the conservative assumption that bioretention facilities were installed in NRCS Group D soils with a very low permeability. The modeling analysis in Section 3.4 compared these results to bioretention facilities with no infiltration to surrounding soils (e.g., facilities with a liner or concrete bottom). The results were very similar, which confirms that the sizing guidance developed in Sections 3.1 and 3.2 can apply to flow-through planters or similar facilities that do not infiltrate to surrounding soils.

#### 5. Sizing Criteria for Facilities with Lower Permeability Soil Media

The modeling analysis in Section 3.5 demonstrated the relationship between percent of annual runoff treated and bioretention soil media permeability. Reducing media permeability would allow for a wider range of bioretention plantings but would also result in a reduction in the percent of annual runoff treated for the same size drainage area. The reduction would be particularly notable for bioretention facilities with smaller sizing factors. The results of the bioretention media permeability analysis were similar to the no underdrain scenarios in Section 3.3. The Section 3.3 results could be used to estimate how reducing media permeability would influence treatment percentages across a wider range of scenarios.

In general, the bioretention surface area sizing criteria for treating 80% of the annual runoff derived from the modeling analyses described herein are significantly lower than the sizing factors that municipalities in the Bay Area have been requiring regulated projects to meet for compliance with permit requirements for some time. As stated in the Introduction (Section 1), the BASMAA Development Committee and BASMAA member agencies intend to use these sizing relationships to develop and justify a “single approach” for implementing non-regulated green street projects when there are constraints on facility size. A work group of the Development Committee was formed to develop policies and guidelines for implementing the new sizing criteria and addressing other related issues. These include defining the conditions, constraints, and types of projects for which the reduced sizing factors can be used; the method for applying the sizing factors; guidelines for when dimensions of other components such as media depths can be adjusted; how the design of other types of green infrastructure measures may be modified; the effectiveness of smaller or modified green infrastructure facilities in terms of pollutant load reduction; and other considerations.

## 5. References

- Contra Costa Clean Water Program (CCCWP). 2006. Hydrograph Modification Management Plan. April 16, 2006.
- Contra Costa Clean Water Program (CCCWP). 2013. IMP Monitoring Report, IMP Model Calibration and Validation Report. September 20, 2013.



### Appendix A: Storm Depths for 1-Hour and 24-Hour Durations

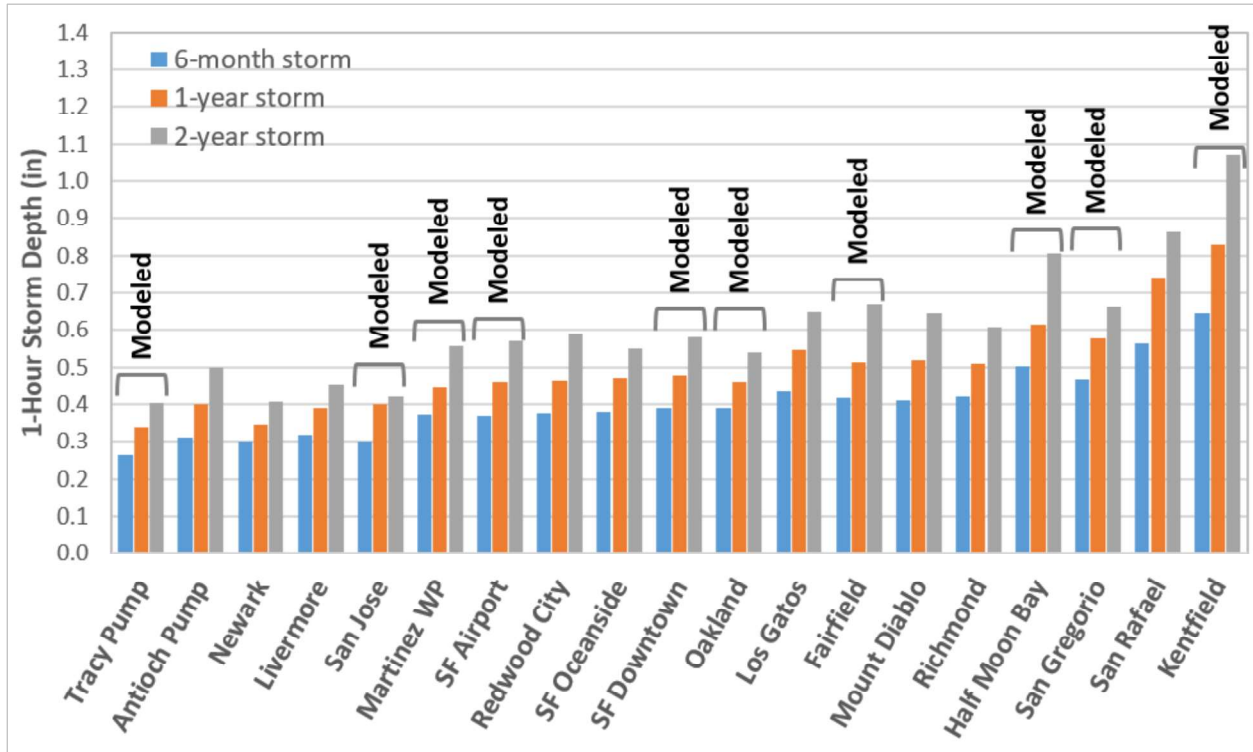


Figure 13. Storm depths for 1-hour duration

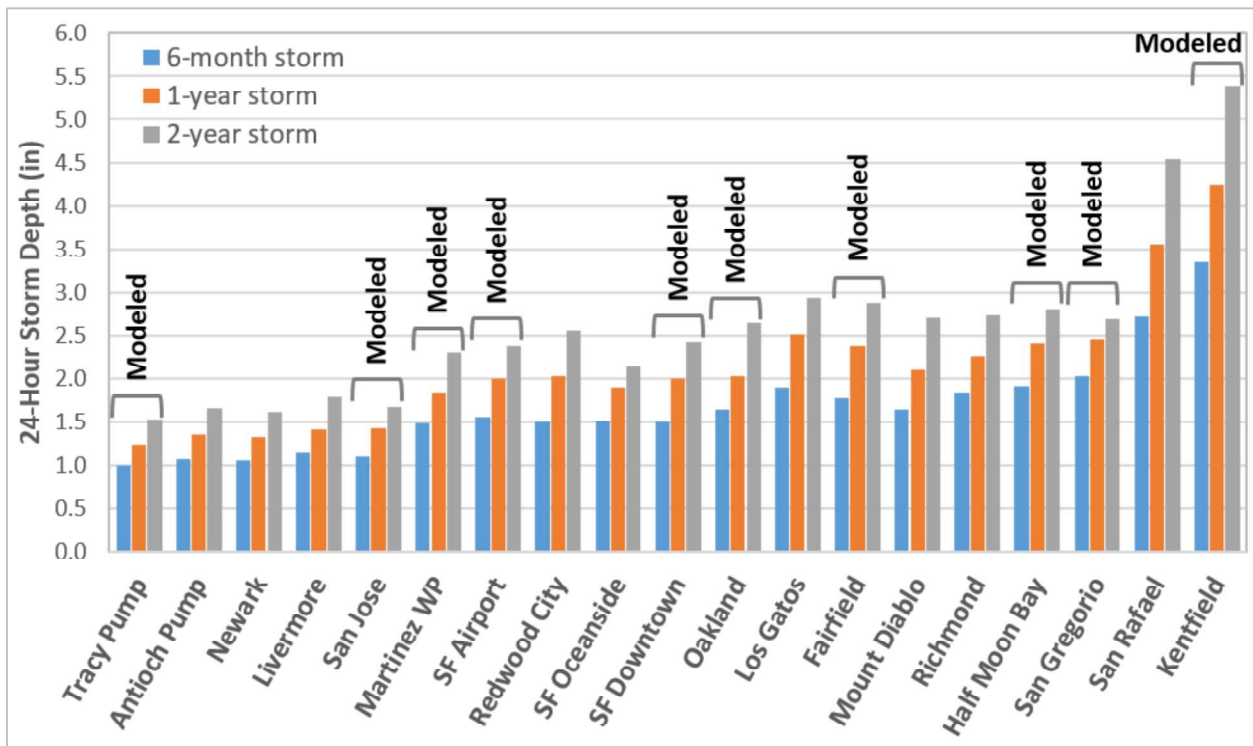


Figure 14. Storm depths for 24-hour duration



## Appendix B: Treatment Percentage Results Graphics for All Rain Gauges

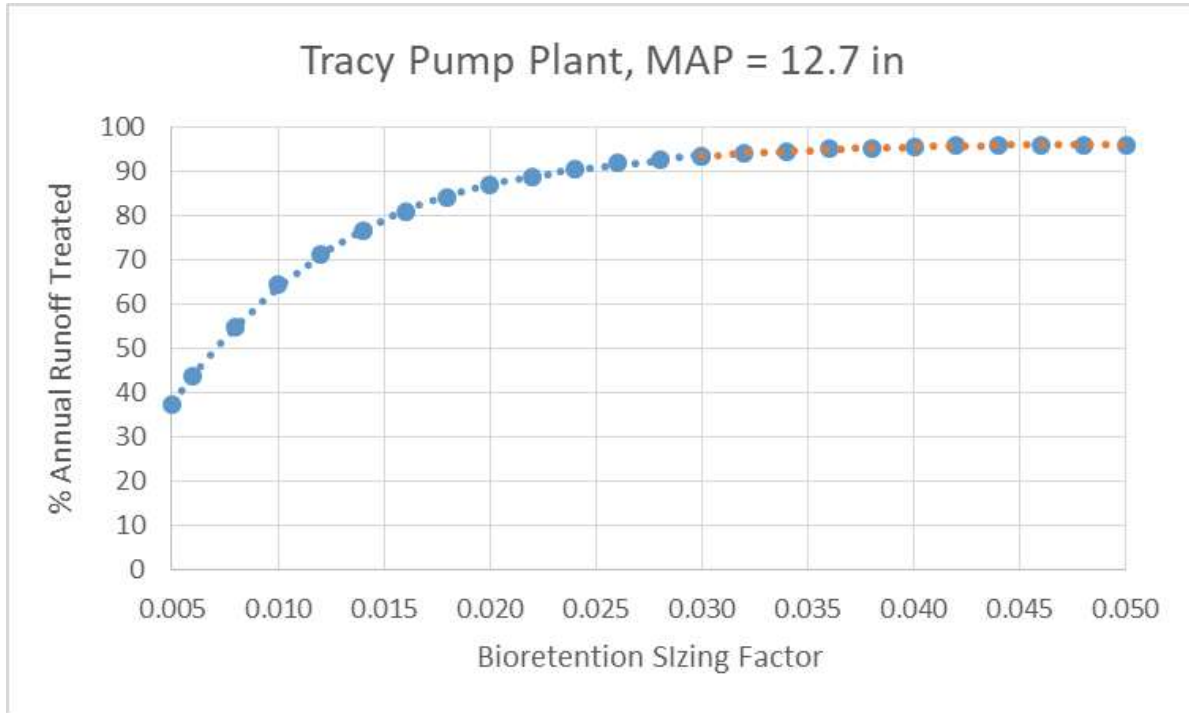


Figure 15. Annual treatment percentage for the Tracy Pump Plant rain gauge

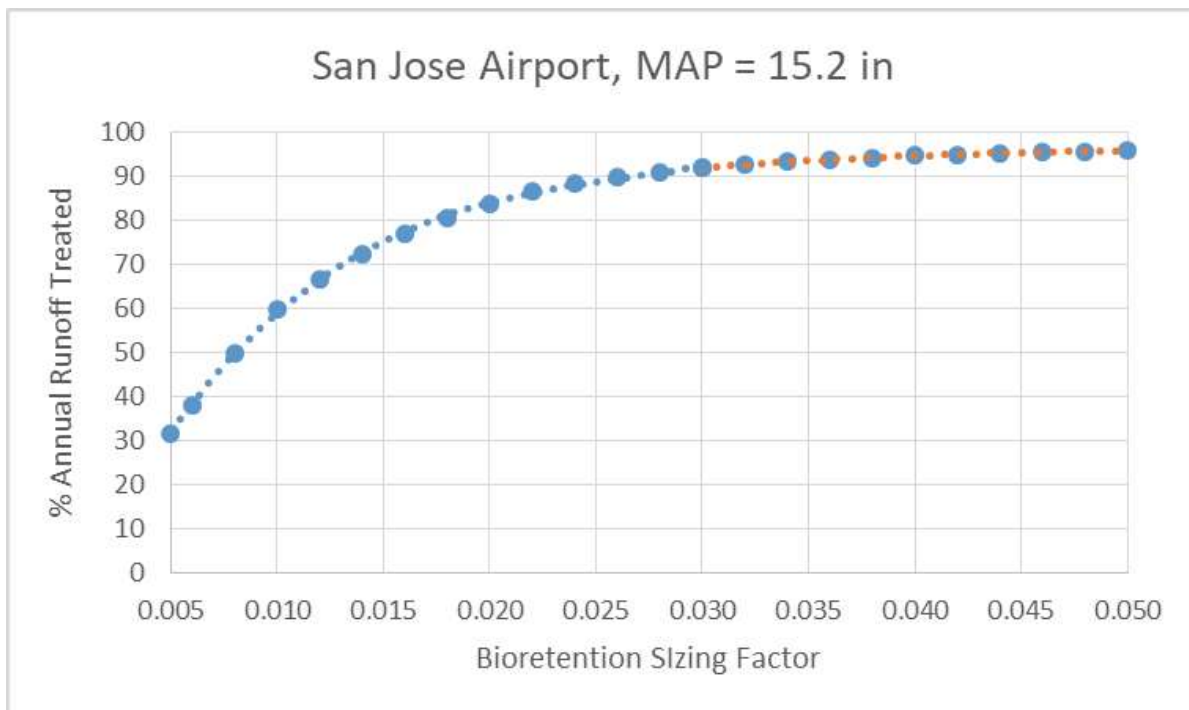


Figure 16. Annual treatment percentage for the San Jose rain gauge

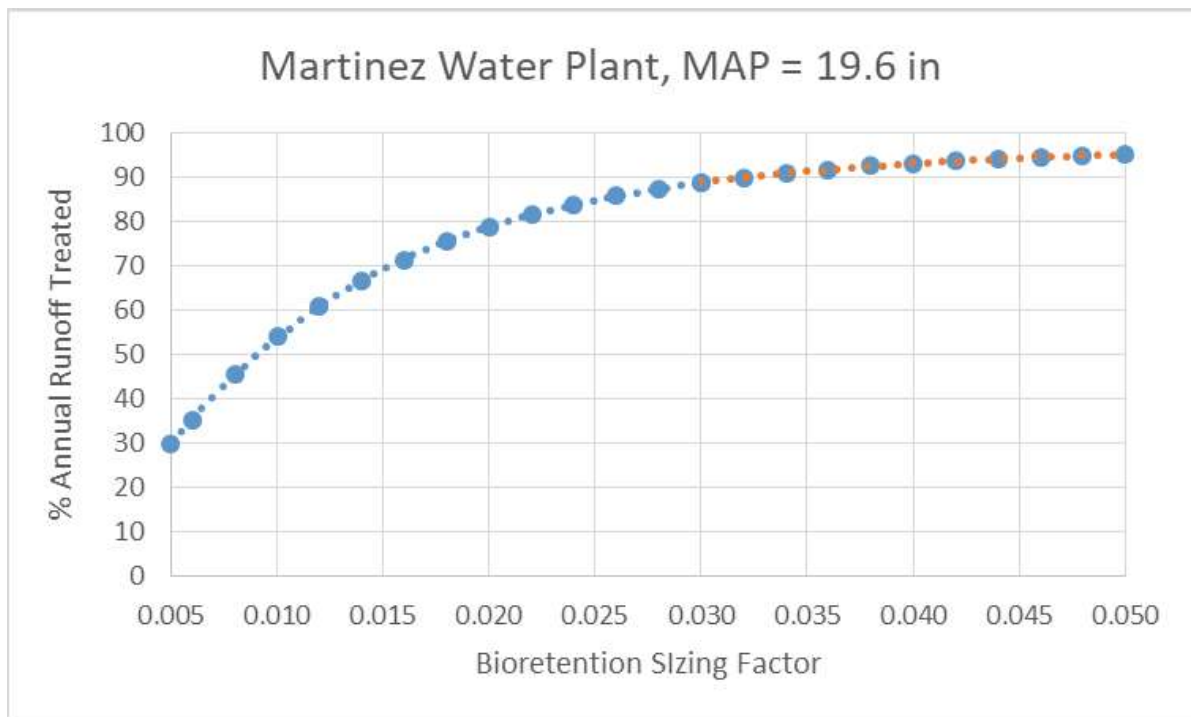


Figure 17. Annual treatment percentage for the Martinez Water Plant rain gauge

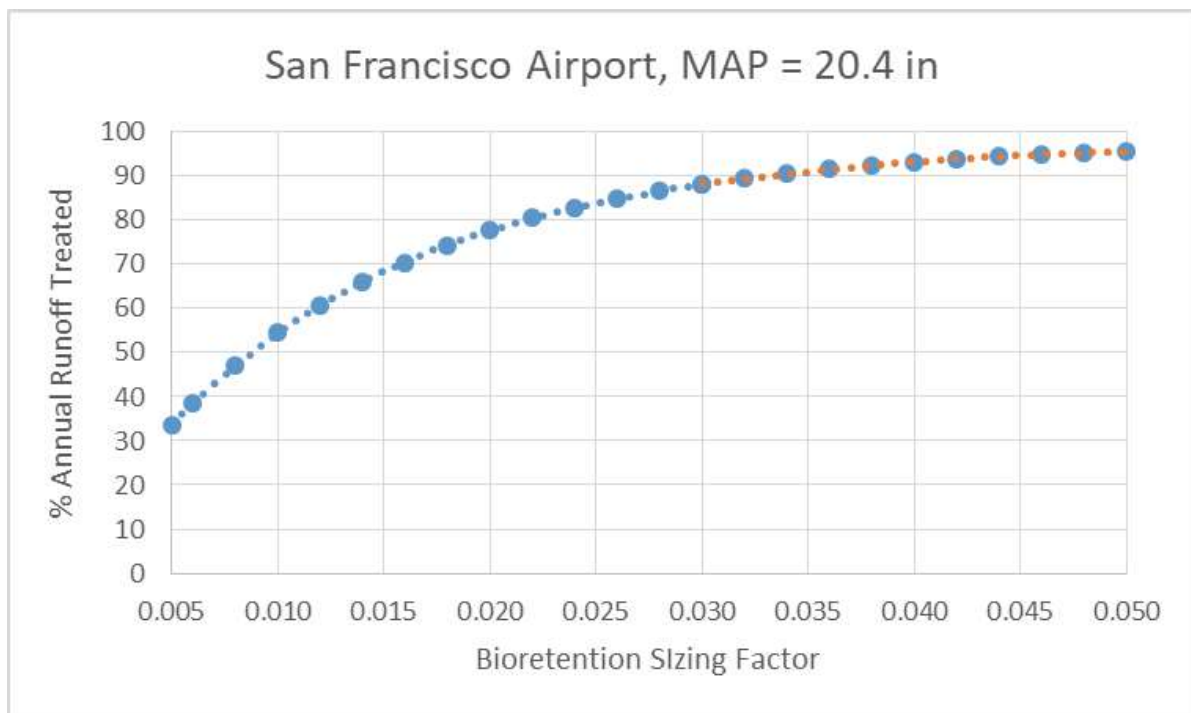


Figure 18. Annual treatment percentage for the San Francisco Airport rain gauge

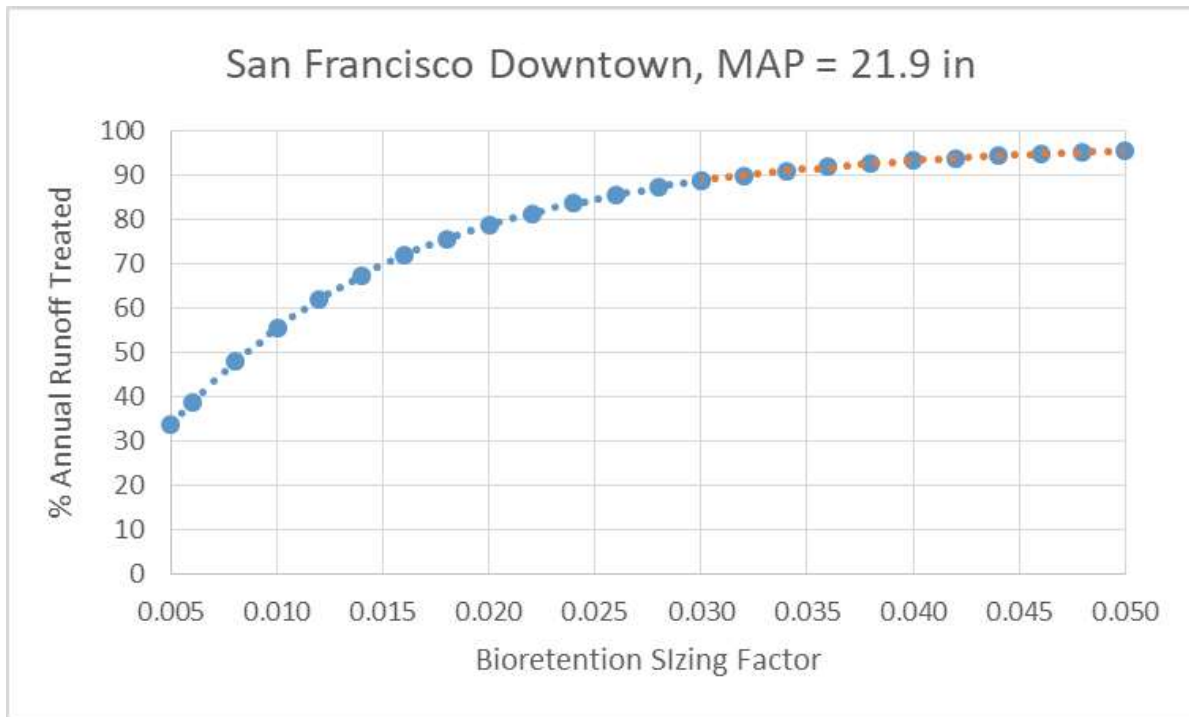


Figure 19. Annual treatment percentage for the San Francisco Downtown rain gauge

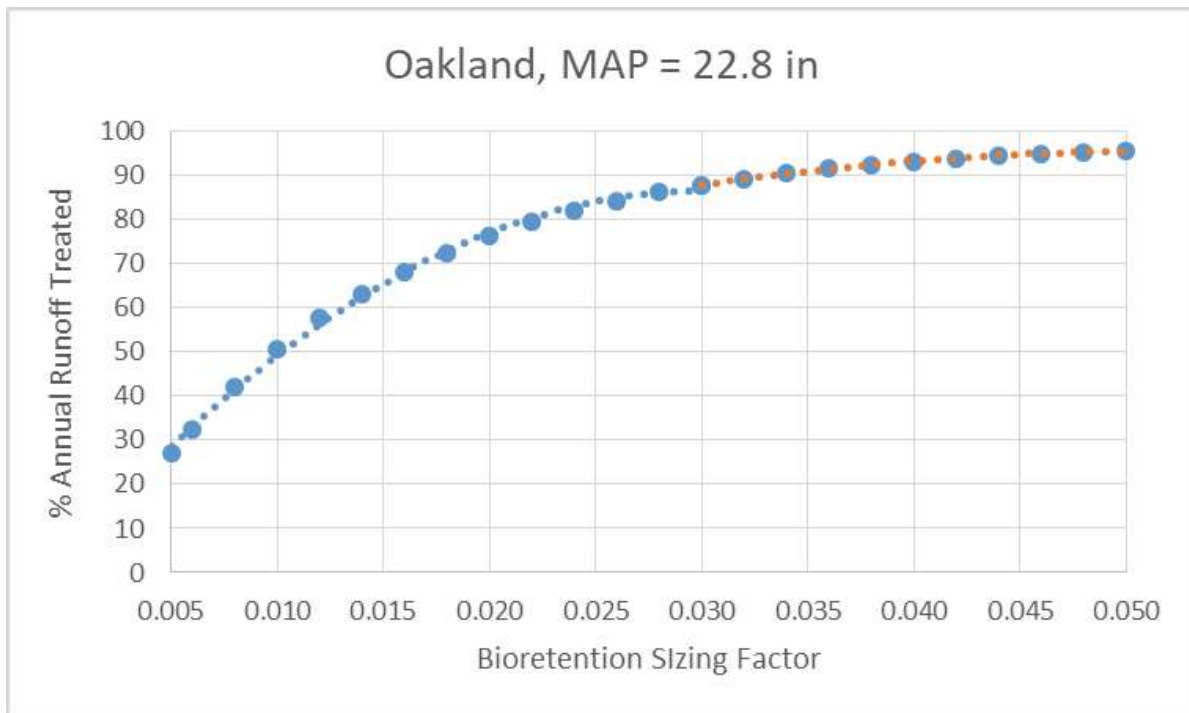


Figure 20. Annual treatment percentage for the Oakland rain gauge

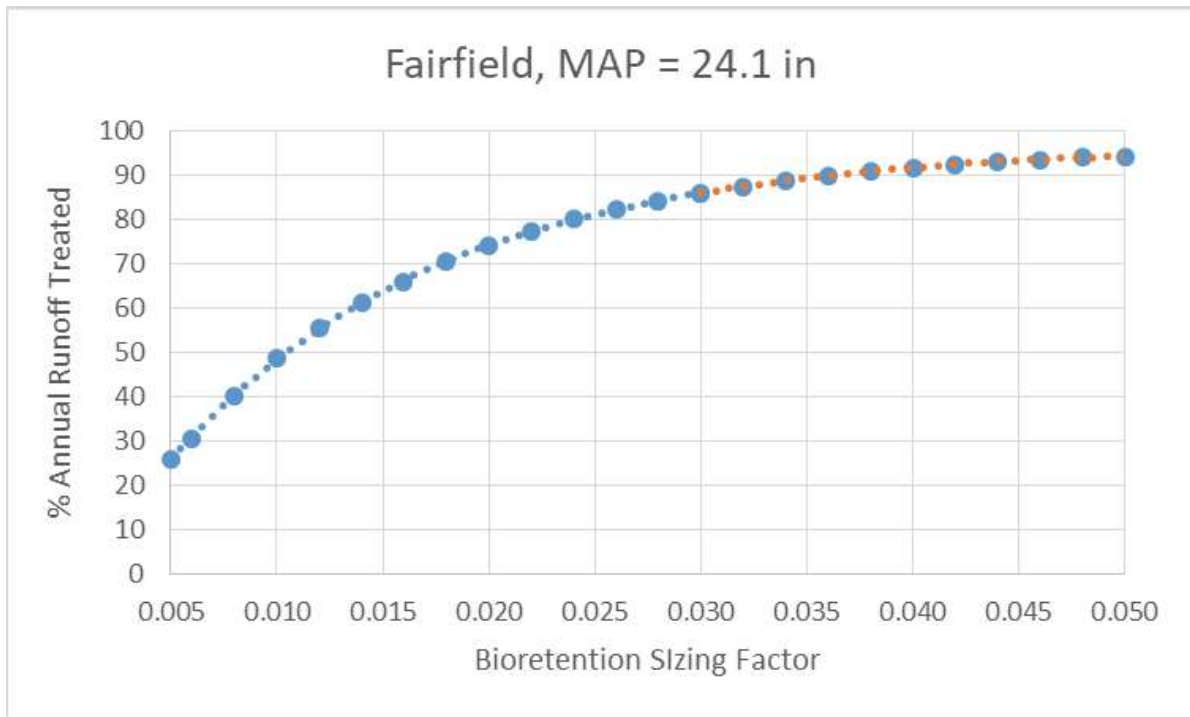


Figure 21. Annual treatment percentage for the Fairfield rain gauge

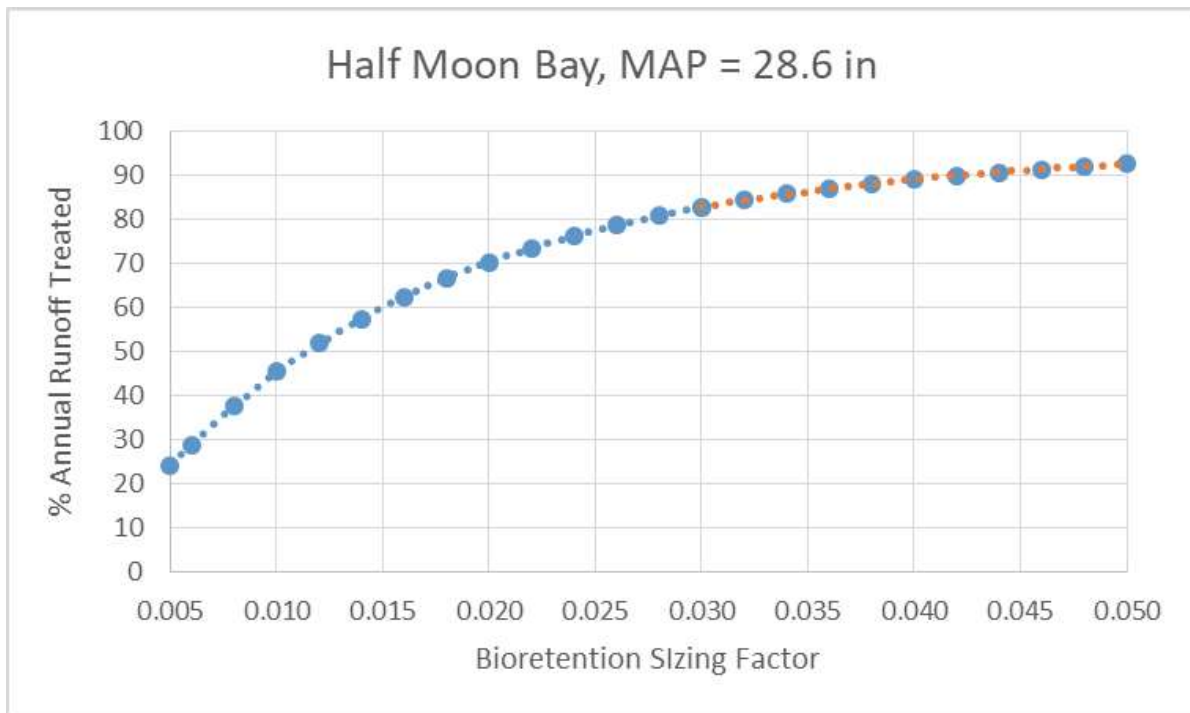


Figure 22. Annual treatment percentage for the Half Moon Bay rain gauge

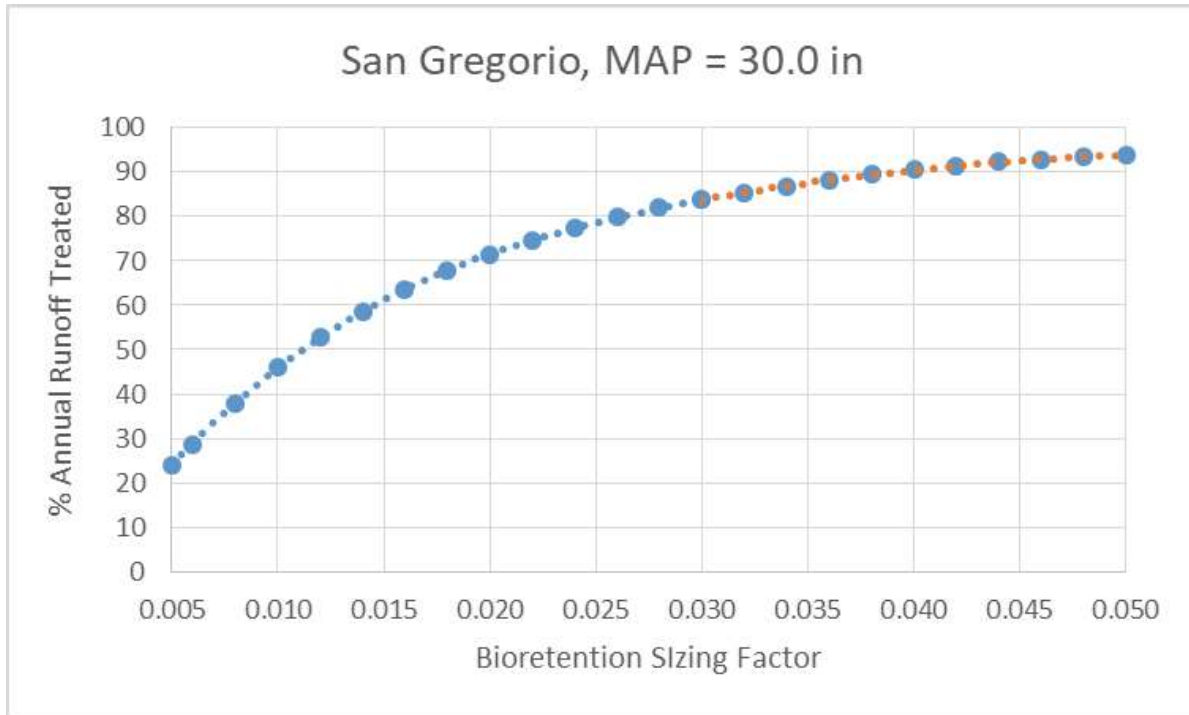


Figure 23. Annual treatment percentage for the San Gregorio rain gauge

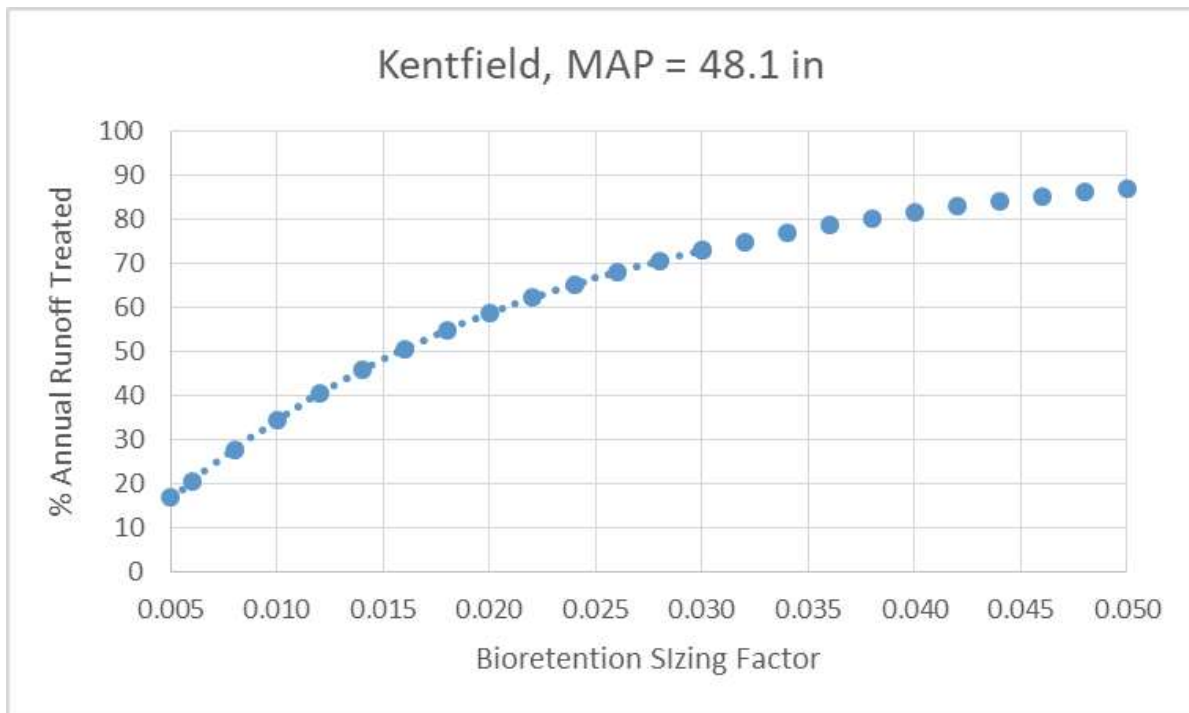


Figure 24. Annual treatment percentage for the Kentfield rain gauge

### Appendix C: Bioretention with No Underdrain, 12-inch Surface Reservoir Results

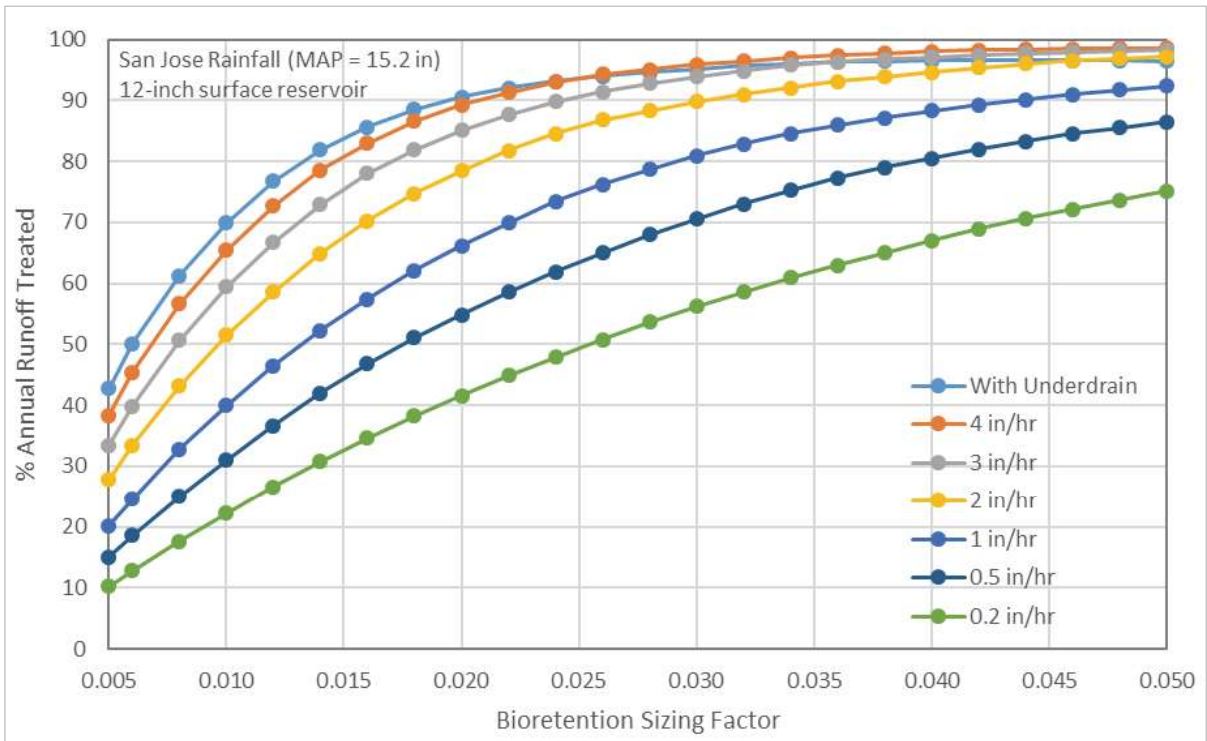


Figure 25. Treatment results for bioretention with no underdrain, San Jose gauge (MAP = 15.2 in)

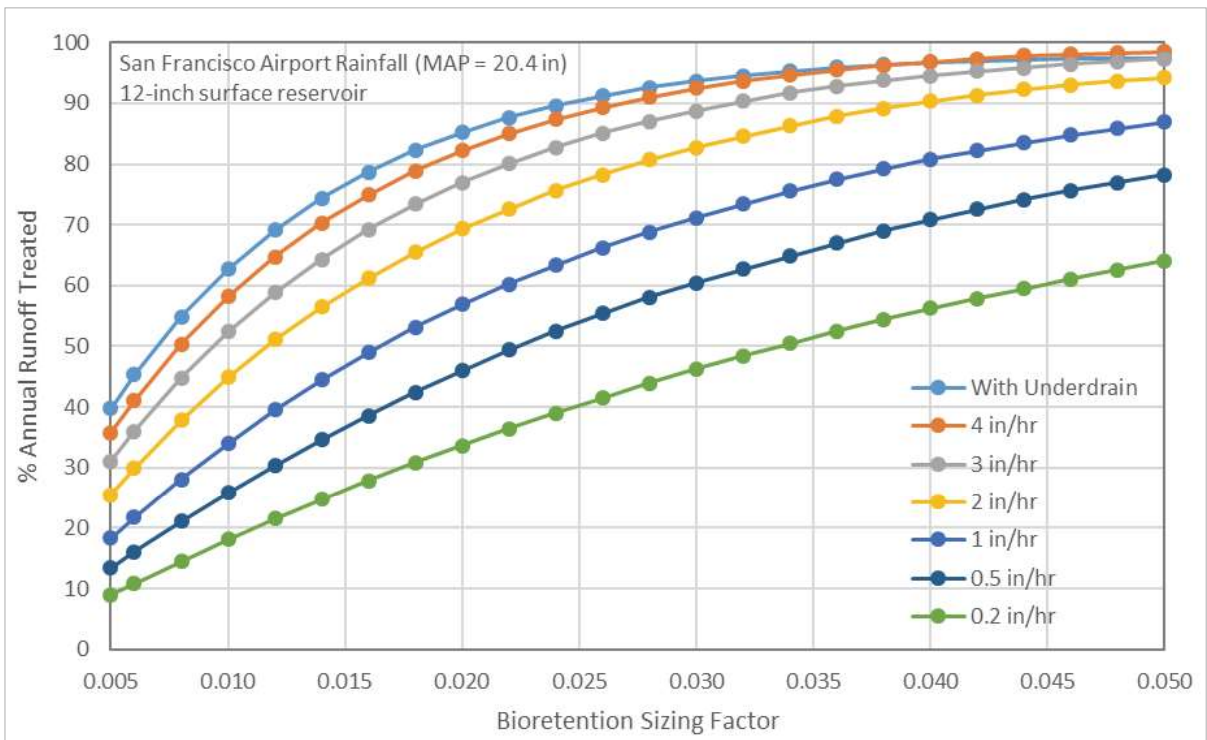


Figure 26. Treatment results for bioretention with no underdrain, San Jose gauge (MAP = 15.2 in)

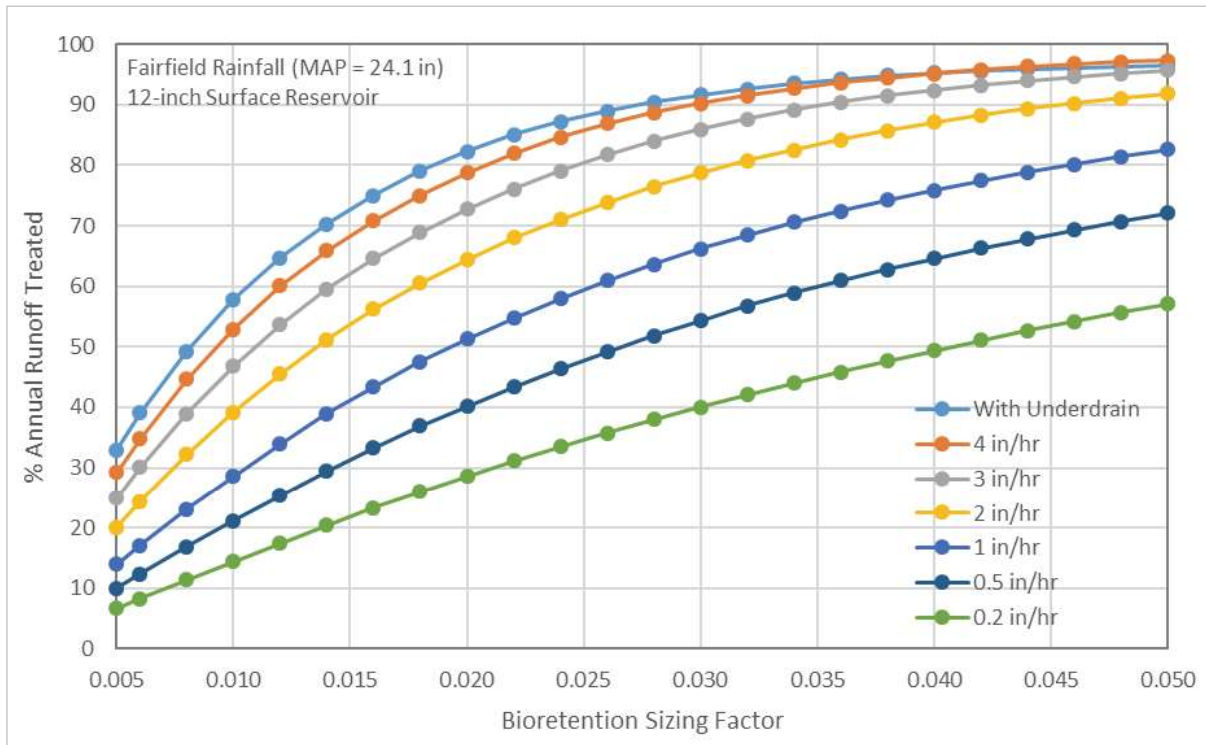


Figure 27. Treatment results for bioretention with no underdrain, San Jose gauge (MAP = 15.2 in)

**APPENDIX E**

**CONDITIONAL ACCEPTANCE OF GUIDANCE FOR  
SIZING GREEN INFRASTRUCTURE FACILITIES IN  
STREET PROJECTS**





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## San Francisco Bay Regional Water Quality Control Board

June 21, 2019  
CIWQS Place ID 756972

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**Subject: Conditional Acceptance of Guidance for Sizing Green Infrastructure Facilities in Street Projects**

Dear MRP Stormwater Program Managers:

This letter provides the Water Board's conditional acceptance of BASMAA's "Guidance for Sizing Green Infrastructure Facilities in Street Projects" (Guidance) and the "Green Infrastructure Facility Sizing for Non-Regulated Street Projects Technical Report" (Report). The Water Board supports Permittee efforts to retrofit existing streets with low impact development/green stormwater infrastructure (LID) bioretention treatment controls and recognizes both the challenges inherent in retrofitting existing urban infrastructure and the substantial water quality and related benefits that can result from successful retrofits.

Municipal Regional Stormwater NPDES Permit (MRP) Permittee studies, including stormwater resource plans and work on reasonable assurance analyses for pollutants of concern, have identified the public right-of-way, and particularly streets, as a key location for retrofits to control urban runoff pollution from the Bay Area's already-built urban environment. The Water Board recognizes the importance of green street retrofits and supports Permittee efforts to implement them. At the same time, there is a potentially significant trade-off between reduced treatment control sizing relative to the tributary area and the likelihood a control will function effectively over its life. All else

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DR. TERRY F. YOUNG, CHAIR | MICHAEL MONTGOMERY, EXECUTIVE OFFICER

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being equal, controls that are relatively larger are more likely to provide water quality and related co-benefits with less attention over time.

MRP Provision C.3.j.i.(g) allows the Permittees to propose an approach for alternate sizing of LID treatment controls to achieve treatment control and hydromodification requirements in certain green streets projects where conventional design storm hydraulic sizing may be difficult:

For street projects not subject to Provision C.3.b.ii (i.e., non-Regulated Projects), Permittees may collectively propose a single approach with their Green Infrastructure Plans for how to proceed should project constraints preclude fully meeting the C.3.d sizing requirements.

The Report, in support of the Guidance, sets forth a sizing approach for bioretention controls for treatment using the combined flow and volume modelling approach. The Report notes, appropriately, that Permittees will design treatment controls to be “as large as feasible.” Where larger sizing is impracticable, this approach enables bioretention controls to be as small a percentage of the tributary area as possible, and as little as 1.5 – 3 percent, while treating at least 80 percent of the average annual runoff based on local precipitation gauge records. This conditional acceptance provides direction on how Permittees should design controls to be as large as practicable, within existing MRP requirements.

The Guidance includes general suggestions regarding an approach for treating less than 80 percent of the total runoff, which may be appropriate for voluntary green street retrofit projects, and could be considered for green infrastructure plan street retrofit projects, in combination with Permittee reasonable assurance analyses and a future, more-detailed proposal of how to implement such reduced sizing. We look forward to working with the Permittees on that.

One aspect of the approach is that it has minimized safety factors, which, as noted in the Guidance, is likely to result in the construction of controls that have a greater need for operation and maintenance work over their lifetime, a higher rate of failure, and may be more likely to have reduced effectiveness and a reduced effective life in the absence of that attention. This calls into question whether the approach meets the C.3.d sizing requirements for Regulated Projects, and whether it should be applied beyond non-Regulated Green Streets retrofit projects. In the absence of additional evaluation of this issue, the reduced sizing approach should not be applied to Regulated Projects.

In addition, BASMAA considered developing, but did not include in this effort, specific guidance regarding how Permittees could determine practicability for using the reduced sizing approach, and regional guidance for green street best management practice installation, such as recommended locations and designs based on typical tributary areas. Such work could be a useful future project. The Guidance does include examples of constraints that could lead to reduced sizing.

The Report and Guidance do not propose an alternative sizing approach for hydromodification. While noting the MRP's triggers for hydromodification controls, the Guidance states categorically that hydromodification controls "...do not apply to street projects that retrofit drainage systems that receive runoff from existing roofs and paving." It is likely that many projects would not trigger the MRP's hydromodification control requirements. However, where the retrofits are part of a project that meets or exceeds the triggers for the MRP's hydromodification requirements, then the requirements would apply. Permittees should continue to review that as part of project implementation.

To better address the question of practicability and to help develop information that can contribute to future guidance regarding green street retrofits, this conditional acceptance directs Permittees to use existing MRP Provision C.3.d regulated project sizing for green street bioretention treatment control initial sizing. The design approaches for that sizing are set forth in the Permittees' existing technical guidance documents. With cause (e.g., significantly constrained area for a BMP, substantially increased costs for that sizing relative to the C.3.j.i.(g) approach, significant amounts of run-on from adjacent areas, or other substantial constraints identified by Permittees), and with reporting in their Annual Reports, Permittees may use the proposed C.3.j.i.(g) sizing for "non-Regulated Project" green streets projects, including non-Regulated Project green streets projects in Permittees' Green Infrastructure Plans and purely voluntary green streets projects.

The intent of the reporting is for the Permittees and the Water Board to, over time, identify more categorically green street retrofit approaches and needs, allowing Permittees to more-easily implement an effective and robust green street retrofit program. We look forward to working with the Permittees to identify appropriate and useful sizing analysis practicability information that can be developed, reported, and/or retained by the Permittees, as appropriate.

This conditional approval categorizes green streets projects into three categories. Regulated Projects under MRP Provision C.3.b, including green street retrofit projects funded all or in part from alternate compliance; green street retrofit projects that are not otherwise Regulated Projects under C.3.b, which may include green street retrofit projects in Green Infrastructure Plans; and purely voluntary green street retrofit projects.

- **Regulated projects:** Should be designed to the sizing standard in C.3.d, using the approaches set forth in existing Permittee technical guidance manuals.<sup>1</sup>
- **Green street retrofit projects in Permittee green infrastructure plans, which are not Regulated Projects under C.3.b:** Should be designed to the sizing standard in C.3.d, using the approaches set forth in existing Permittee technical guidance manuals. If Permittee analysis determines there is substantial cause to

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<sup>1</sup> The Water Board may consider changes to this approach for Regulated Projects in a future MRP reissuance, following additional discussion regarding safety factors, control performance, and more-specific guidance regarding implementation.

reduce the sizing to the proposed C.3.j.i.(g) approach, then reduce the sizing, with reporting in the Permittee's annual report as to why larger sizing was impracticable.

- **Voluntary green street retrofit projects outside of green infrastructure plans:** Permittees should determine whether controls can be designed to the C.3.d sizing standard, using the approaches set forth in existing Permittee technical guidance manuals. To the extent that is not possible, they should use the C.3.j.i.(g) approach.

The Guidance notes that even with site-specific constraints, it may still be desirable to design bioretention treatment controls to treat amounts of runoff below the 80 percent of average annual runoff standard. We agree. It notes, further, that “[p]ollutant reduction achieved by GI facilities in street projects will be estimated in accordance with the Interim accounting Methodology or the applicable Reasonable Assurance Analysis.” We look forward to working with the Permittees to establish an agreed-upon approach for estimating pollutant load reductions associated with smaller-sized facilities. In addition, we are interested to work with the Permittees regarding guidance on bounds for control sizing, such as particular control designs to use or bounds below which the operation and maintenance burden may be unreasonably high relative to the benefits achieved.

We look forward to working with you to identify appropriate reporting regarding use of the Guidance and Report that can be completed prior to the MRP's reissuance, and which could inform the reissuance. Reporting is likely to include a narrative discussion of how Permittees implemented the alternative design guidance for projects using it, and consideration of how to track partial treatment with respect to crediting for Provisions C.11 and C.12.

If you have any questions or would like to discuss this matter further, please contact Dale Bowyer at (510) 622-2323 or [dale.bowyer@waterboards.ca.gov](mailto:dale.bowyer@waterboards.ca.gov).

Sincerely,

Keith H. Lichten, Chief  
Watershed Management Division

## **APPENDIX F**

# **GUIDANCE FOR IDENTIFYING GREEN INFRASTRUCTURE POTENTIAL IN MUNICIPAL CAPITAL IMPROVEMENT PROGRAM PROJECTS**

BASMAA Development Committee

Guidance for Identifying Green Infrastructure Potential  
in Municipal Capital Improvement Program Projects  
May 6, 2016

**Background**

In the recently reissued [Municipal Regional Stormwater Permit](#) (“MRP 2.0”), Provision C.3.j. requires Permittees to develop and implement Green Infrastructure Plans to reduce the adverse water quality impacts of urbanization on receiving waters over the long term. Provisions C.11 and C.12 require the Permittees to reduce discharges of Mercury and PCBs, and portion of these load reductions must be achieved by implementing Green Infrastructure. Specifically, Permittees collectively must implement Green Infrastructure to reduce mercury loading by 48 grams/year and PCB loading by 120 grams/year by 2020, and plan for substantially larger reductions in the following decades. Green Infrastructure on both public and private land will help to meet these load reduction requirements, improve water quality, and provide multiple other benefits as well. Implementation on private land is achieved by implementing stormwater requirements for new development and redevelopment (Provision C.3.a. through Provision C.3.i.). These requirements were carried forward, largely unchanged, from MRP 1.0.

MRP 2.0 defines Green Infrastructure as:

Infrastructure that uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, green infrastructure refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, green infrastructure refers to stormwater management systems that mimic nature by soaking up and storing water.

In practical terms, most green infrastructure will take the form of diverting runoff from existing streets, roofs, and parking lots to one of two stormwater management strategies:

1. Dispersal to vegetated areas, where sufficient landscaped area is available and slopes are not too steep.
2. LID (bioretention and infiltration) facilities, built according to criteria similar to those currently required for regulated private development and redevelopment projects under Provision C.3.

In some cases, the use of tree-box-type biofilters may be appropriate<sup>1</sup>. In other cases, where conditions are appropriate, existing impervious pavements may be removed and replaced with pervious pavements.

In MRP 2.0, Provision C.3.j. includes requirements for Green Infrastructure planning and implementation. Provision C.3.j. has two main elements to be implemented by municipalities:

1. Preparation of a Green Infrastructure Plan for the inclusion of LID drainage design into storm drain infrastructure on public and private land, including streets, roads, storm drains, etc.
2. Early implementation of green infrastructure projects (“no missed opportunities”),

This guidance addresses the second of these requirements. The intent of the “no missed opportunities” requirement is to ensure that no major infrastructure project is built without assessing the opportunity for incorporation of green infrastructure features.

Provision C.3.j.ii. requires that each Permittee prepare and maintain a list of green infrastructure projects, public and private, that are already planned for implementation during the permit term (not including C.3-regulated projects), and infrastructure projects planned for

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<sup>1</sup> Standard proprietary tree-box-type biofilters are considered to be non-LID treatment and will only be allowed under certain circumstances. Guidance on use and sizing of these facilities will be provided in a separate document.

implementation during the permit term that have potential for green infrastructure measures. The list must be submitted with each Annual Report, including:

“... a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practical during the permit term. For any public infrastructure project where implementation of green infrastructure measures is not practicable, submit a brief description for the project and the reasons green infrastructure measures were impracticable to implement”.

This requirement has no specified start date; “during the permit term” means beginning January 1, 2016 and before December 31, 2020. The first Annual Report submittal date will be September 30, 2016.

Note that this guidance primarily addresses the review of proposed or planned public projects for green infrastructure opportunities. The Permittee may also be aware of proposed or planned private projects, not subject to LID treatment requirements, that may have the opportunity to incorporate green infrastructure. These should be addressed in the same way as planned public projects, as described below.

### **Procedure for Review of Planned Public Projects and Annual Reporting**

The municipality’s Capital Improvement Program (CIP) project list provides a good starting point for review of proposed public infrastructure projects. Review of other lists of public infrastructure projects, such as those proposed within separately funded special districts (e.g., lighting and landscape districts, maintenance districts, and community facilities districts), may also be appropriate. This section describes a two-part procedure for conducting the review.

#### **Part 1 – Initial Screening**

The first step in reviewing a CIP or other public project list is to screen out certain types of projects from further consideration. For example, some projects (e.g., interior remodels, traffic signal replacement) can be readily identified as having no green infrastructure potential. Other projects may appear on the list with only a title, and it may be too early to identify whether green infrastructure could be included. Still others have already progressed past the point where the design can reasonably be changed (this will vary from project to project, depending on available budget and schedule).

Some “projects” listed in a CIP may provide budget for multiple maintenance or minor construction projects throughout the jurisdiction or a portion of the jurisdiction, such as a tree planting program, curb and sidewalk repair/upgrade, or ADA curb/ramp compliance. It is recommended that these types of projects not be included in the review process described herein. The priority for incorporating green infrastructure into these types of projects needs to be assessed as part of the Permittees’ development of Green Infrastructure Plans, and standard details and specifications need to be developed and adopted. During this permit term, Permittees will evaluate select projects, project types, and/or groups of projects as case studies and develop an approach as part of Green Infrastructure planning.

The projects removed through the initial screening process do not need to be reported to the Water Board in the Permittee’s Annual Report. However, the process should be documented and records kept as to the reason the project was removed from further consideration. Note that projects that were determined to be too early to assess will need to be reassessed during the next fiscal year’s review.

The following categories of projects may be screened out of the review process in a given fiscal year:

1. **Projects with No Potential** - The project is identified in initial screening as having no green infrastructure potential based on the type of project. For example, the project does not include any exterior work. Attachment 1 provides a suggested list of such projects that Permittees may use as a model for their own internal process.

2. **Projects Too Early to Assess** – There is not yet enough information to assess the project for green infrastructure potential, or the project is not scheduled to begin design within the permit term (January 2016 – December 2020). If the project is scheduled to begin within the permit term, an assessment will be conducted if and when the project moves forward to conceptual design.
3. **Projects Too Late to Change** – The project is under construction or has moved to a stage of design in which changes cannot be made. The stage of design at which it is too late to incorporate green infrastructure measures varies with each project, so a “percent-complete” threshold has not been defined. Some projects may have funding tied to a particular conceptual design and changes cannot be made even early in the design process, while others may have adequate budget and time within the construction schedule to make changes late in the design process. Agencies will need to make judgments on a case-by-case basis.
4. **Projects Consisting of Maintenance or Minor Construction Work Orders** – The “project” includes budgets for multiple maintenance or minor construction work orders throughout the jurisdiction or a portion of the jurisdiction. These types of projects will not be individually reviewed for green infrastructure opportunity but will be considered as part of a municipality’s Green Infrastructure Plan.

## **Part 2 – Assessment of Green Infrastructure Potential**

After the initial screening, the remaining projects either already include green infrastructure or will need to go through an assessment process to determine whether or not there is potential to incorporate green infrastructure. A recommended process for conducting the assessment is provided later in this guidance. As a result of the assessment, the project will fall into one of the following categories with associated annual reporting requirements. Attachment 2 provides the relevant pages of the FY 15-16 Annual Report template for reference.

- **Project is a C.3-regulated project and will include LID treatment.**

*Reporting:* Follow current C.3 guidance and report the project in Table C.3.b.iv.(2) of the Annual Report for the fiscal year in which the project is approved.

- **Project already includes green infrastructure and is funded.**

*Reporting:* List the project in “Table B-Planned Green Infrastructure Projects” in the Annual Report, indicate the planning or implementation status, and describe the green infrastructure measures to be included.

- **Project may have green infrastructure potential** pending further assessment of feasibility, incremental cost, and availability of funding.

*Reporting:* If the feasibility assessment is not complete and/or funding has not been identified, list the project in “Table A-Public Projects Reviewed for Green Infrastructure” in the Annual Report. In the “GI Included?” column, state either “TBD” (to be determined) if the assessment is not complete, or “Yes” if it has been determined that green infrastructure is feasible. In the rightmost column, describe the green infrastructure measures considered and/or proposed, and note the funding and other contingencies for inclusion of green infrastructure in the project. Once funding for the project has been identified, the project should be moved to “Table B-Planned Green Infrastructure Projects” in future Annual Reports.

- **Project does not have green infrastructure potential.** A project-specific assessment has been completed, and Green Infrastructure is impracticable.

*Reporting:* In the Annual Report, list the project in “Table A-Public Projects Reviewed for Green Infrastructure”. In the “GI Included?” column, state “No.” Briefly state the reasons for the determination in the rightmost column. Prepare more detailed documentation of the reasons for the determination and keep it in the project files.



## Process for Assessing Green Infrastructure Potential of a Public Infrastructure Project

### Initial Assessment of Green Infrastructure Potential

Consider opportunities that may be associated with:

- Alterations to roof drainage from existing buildings
- New or replaced pavement or drainage structures (including gutters, inlets, or pipes)
- Concrete work
- Landscaping, including tree planting
- Streetscape improvements and intersection improvements (other than signals)

### Step 1: Information Collection/Reconnaissance

For projects that include alterations to building drainage, identify the locations of roof leaders and downspouts, and where they discharge or where they are connected to storm drains.

For street and landscape projects:

- Evaluate potential opportunities to substitute pervious pavements for impervious pavements.
- Identify and locate drainage structures, including storm drain inlets or catch basins.
- Identify and locate drainage pathways, including curb and gutter.

Identify landscaped areas and paved areas that are adjacent to, or down gradient from, roofs or pavement. These are potential facility locations. *If there are any such locations, continue to the next step.* Note that the project area boundaries may be, but are not required to be, expanded to include potential green infrastructure facilities.

### Step 2: Preliminary Sizing and Drainage Analysis

Beginning with the potential LID facility locations that seem most feasible, identify possible pathways to direct drainage from roofs and/or pavement to potential LID facility locations—by sheet flow, valley gutters, trench drains, or (where gradients are steeper) via pipes, based on existing grades and drainage patterns. Where existing grades constrain natural drainage to potential facilities, the use of pumps may be considered (as a less preferable option).

Delineate (roughly) the drainage area tributary to each potential LID facility location. Typically, this requires site reconnaissance, which may or may not include the use of a level to measure relative elevations.

Use the following preliminary sizing factor (facility area/tributary area) for the potential facility location and determine which of the following could be constructed within the existing right-of-way or adjacent vacant land. Note that these sizing factors are guidelines (not strict rules, but targets):

- Sizing factor  $\geq 0.5$  for dispersal to landscape or pervious pavement<sup>2</sup> (i.e., a maximum 2:1 ratio of impervious area to pervious area)
- Sizing factor  $\geq 0.04$  for bioretention
- Sizing factor  $\geq 0.004$  (or less) for tree-box-type biofilters

For bioretention facilities requiring underdrains and tree-box-type biofilters, note if there are potential connections from the underdrain to the storm drain system (typically 2.0 feet below soil surface for bioretention facilities, and 3.5 feet below surface for tree-box-type biofilters).

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<sup>2</sup> Note that pervious pavement systems are typically designed to infiltrate only the rain falling on the pervious pavement itself, with the allowance for small quantities of runoff from adjacent impervious areas. If significant runoff from adjacent areas is anticipated, preliminary sizing considerations should include evaluation of the depth of drain rock layer needed based on permeability of site soils.

If, in this step, you have confirmed there may be feasible potential facility locations, *continue to the next step.*

### **Step 3: Barriers and Conflicts**

*Note that barriers and conflicts do not necessarily mean implementation is infeasible; however, they need to be identified and taken into account in future decision-making, as they may affect cost or public acceptance of the project.*

Note issues such as:

- Confirmed or potential conflicts with subsurface utilities
- Known or unknown issues with property ownership, or need for acquisition or easements
- Availability of water supply for irrigation, or lack thereof
- Extent to which green infrastructure is an “add on” vs. integrated with the rest of the project

### **Step 4: Project Budget and Schedule**

Consider sources of funding that may be available for green infrastructure. It is recognized that lack of budget may be a serious constraint for the addition of green infrastructure in public projects. For example, acquisition of additional right-of-way or easements for roadway projects is not always possible. Short and long term maintenance costs also need to be considered, and jurisdictions may not have a funding source for landscape maintenance, especially along roadways. The objective of this process is to identify opportunities for green infrastructure, so that if and when funding becomes available, implementation may be possible.

Note any constraints on the project schedule, such as a regulatory mandate to complete the project by a specific date, grant requirements, etc., that could complicate aligning a separate funding stream for the green infrastructure element. Consider whether cost savings could be achieved by integrating the project with other planned projects, such as pedestrian or bicycle safety improvement projects, street beautification, etc., if the schedule allows.

### **Step 5: Assessment—Does the Project Have Green Infrastructure Potential?**

Consider the ancillary benefits of green infrastructure, including opportunities for improving the quality of public spaces, providing parks and play areas, providing habitat, urban forestry, mitigating heat island effects, aesthetics, and other valuable enhancements to quality of life.

Based on the information above, would it make sense to include green infrastructure into this project—if funding were available for the potential incremental costs of including green infrastructure in the project? Identify any additional conditions that would have to be met for green infrastructure elements to be constructed consequent with the project.

## **Attachment 1**

### **Examples of Projects with No Potential for Green Infrastructure**

- Projects with no exterior work (e.g., interior remodels)
- Projects involving exterior building upgrades or equipment (e.g., HVAC, solar panels, window replacement, roof repairs and maintenance)
- Projects related to development and/or continued funding of municipal programs or related organizations
- Projects related to technical studies, mapping, aerial photography, surveying, database development/upgrades, monitoring, training, or update of standard specs and details
- Construction of new streetlights, traffic signals or communication facilities
- Minor bridge and culvert repairs/replacement
- Non-stormwater utility projects (e.g., sewer or water main repairs/replacement, utility undergrounding, treatment plant upgrades)
- Equipment purchase or maintenance (including vehicles, street or park furniture, equipment for sports fields and golf courses, etc.)
- Irrigation system installation, upgrades or repairs

**Attachment 2**

**Excerpts from the C.3 Section of the FY 15-16 Annual Report Template:  
Tables for Reporting C.3-Regulated Projects and Green Infrastructure Projects**

Permittee Name: \_\_\_\_\_

**C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 1) – Projects Approved During the Fiscal Year Reporting Period**

Project Name Project No.	Project Location <sup>9</sup> , Street Address	Name of Developer	Project Phase No. <sup>10</sup>	Project Type & Description <sup>11</sup>	Project Watershed <sup>12</sup>	Total Site Area (Acres)	Total Area of Land Disturbed (Acres)	Total New Impervious Surface Area (ft <sup>2</sup> ) <sup>13</sup>	Total Replaced Impervious Surface Area (ft <sup>2</sup> ) <sup>14</sup>	Total Pre-Project Impervious Surface Area <sup>15</sup> (ft <sup>2</sup> )	Total Post-Project Impervious Surface Area <sup>16</sup> (ft <sup>2</sup> )
<b>Private Projects</b>											
<b>Public Projects</b>											
Comments:											
<b>Guidance: If necessary, provide any additional details or clarifications needed about listed projects in this box. Do not leave any cells blank.</b>											

<sup>9</sup>Include cross streets

<sup>10</sup>If a project is being constructed in phases, indicate the phase number and use a separate row entry for each phase. If not, enter "NA".

<sup>11</sup>Project Type is the type of development (i.e., new and/or redevelopment). Example descriptions of development are: 5-story office building, residential with 160 single-family homes with five 4-story buildings to contain 200 condominiums, 100 unit 2-story shopping mall, mixed use retail and residential development (apartments), industrial warehouse.

<sup>12</sup>State the watershed(s) in which the Regulated Project is located. Downstream watershed(s) may be included, but this is optional.

<sup>13</sup>All impervious surfaces added to any area of the site that was previously existing pervious surface.

<sup>14</sup>All impervious surfaces added to any area of the site that was previously existing impervious surface.

<sup>15</sup>For redevelopment projects, state the pre-project impervious surface area.

<sup>16</sup>For redevelopment projects, state the post-project impervious surface area.

Permittee Name: \_\_\_\_\_

**C.3.b.iv.(2) ► Regulated Projects Reporting Table (part 2) – Projects Approved During the Fiscal Year Reporting Period (public projects)**

Project Name Project No.	Approval Date <sup>29</sup>	Date Construction Scheduled to Begin	Source Control Measures <sup>30</sup>	Site Design Measures <sup>31</sup>	Treatment Systems Approved <sup>32</sup>	Operation & Maintenance Responsibility Mechanism <sup>33</sup>	Hydraulic Sizing Criteria <sup>34</sup>	Alternative Compliance Measures <sup>35/36</sup>	Alternative Certification <sup>37</sup>	HM Controls <sup>38/39</sup>
Public Projects										
Comments: <b>Guidance: If necessary, provide any additional details or clarifications needed about listed projects in this box. Note that MRP Provision C.3.c. contains specific requirements for LID site design and source control measures, as well as treatment measures, for <u>all</u> Regulated Projects. Entries in these columns should not be "None" or "NA". Do not leave any cells blank.</b>										

<sup>29</sup>For public projects, enter the plans and specifications approval date.

<sup>30</sup>List source control measures approved for the project. Examples include: properly designed trash storage areas; storm drain stenciling or signage; efficient landscape irrigation systems; etc.

<sup>31</sup>List site design measures approved for the project. Examples include: minimize impervious surfaces; conserve natural areas, including existing trees or other vegetation, and soils; construct sidewalks, walkways, and/or patios with permeable surfaces, etc.

<sup>32</sup>List all approved stormwater treatment system(s) to be installed onsite or at a joint stormwater treatment facility (e.g., flow through planter, bioretention facility, infiltration basin, etc.).

<sup>33</sup>List the legal mechanism(s) (e.g., maintenance plan for O&M by public entity, etc...) that have been or will be used to assign responsibility for the maintenance of the post-construction stormwater treatment systems.

<sup>34</sup>See Provision C.3.d.i. "Numeric Sizing Criteria for Stormwater Treatment Systems" for list of hydraulic sizing design criteria. Enter the corresponding provision number of the appropriate criterion (i.e., 1.a., 1.b., 2.a., 2.b., 2.c., or 3).

<sup>35</sup>For Alternative Compliance at an offsite location in accordance with Provision C.3.e.i.(1), on a separate page, give a discussion of the alternative compliance site including the information specified in Provision C.3.b.v.(1)(m)(i) for the offsite project.

<sup>36</sup>For Alternative Compliance by paying in-lieu fees in accordance with Provision C.3.e.i.(2), on a separate page, provide the information specified in Provision C.3.b.v.(1)(m)(ii) for the Regional Project.

<sup>37</sup>Note whether a third party was used to certify the project design complies with Provision C.3.d.

<sup>38</sup>If HM control is not required, state why not.

<sup>39</sup>If HM control is required, state control method used (e.g., method to design and size device(s) or method(s) used to meet the HM Standard, and description of device(s) or method(s) used, such as detention basin(s), bioretention unit(s), regional detention basin, or in-stream control).

**C.3.j.ii.(2) ► Table A - Public Projects Reviewed for Green Infrastructure**

Project Name and Location <sup>43</sup>	Project Description	Status <sup>44</sup>	GI Included? <sup>45</sup>	Description of GI Measures Considered and/or Proposed or Why GI is Impracticable to Implement <sup>46</sup>
EXAMPLE: Storm drain retrofit, Stockton and Taylor	Installation of new storm drain to accommodate the 10-yr storm event	Beginning planning and design phase	TBD	Bioretention cells (i.e., linear bulb-outs) will be considered when street modification designs are incorporated

**C.3.j.ii.(2) ► Table B - Planned Green Infrastructure Projects**

Project Name and Location <sup>47</sup>	Project Description	Planning or Implementation Status	Green Infrastructure Measures Included
EXAMPLE: Martha Gardens Green Alleys Project	Retrofit of degraded pavement in urban alleyways lacking good drainage	Construction completed October 17, 2015	The project drains replaced concrete pavement and existing adjacent structures to a center strip of pervious pavement and underlying infiltration trench.

<sup>43</sup> List each public project that is going through your agency’s process for identifying projects with green infrastructure potential.  
<sup>44</sup> Indicate status of project, such as: beginning design, under design (or X% design), projected completion date, completed final design date, etc.  
<sup>45</sup> Enter “Yes” if project will include GI measures, “No” if GI measures are impracticable to implement, or “TBD” if this has not yet been determined.  
<sup>46</sup> Provide a summary of how each public infrastructure project with green infrastructure potential will include green infrastructure measures to the maximum extent practicable during the permit term. If review of the project indicates that implementation of green infrastructure measures is not practicable, provide the reasons why green infrastructure measures are impracticable to implement.  
<sup>47</sup> List each planned (and expected to be funded) public and private green infrastructure project that is not also a Regulated Project as defined in Provision C.3.b.ii. Note that funding for green infrastructure components may be anticipated but is not guaranteed to be available or sufficient.